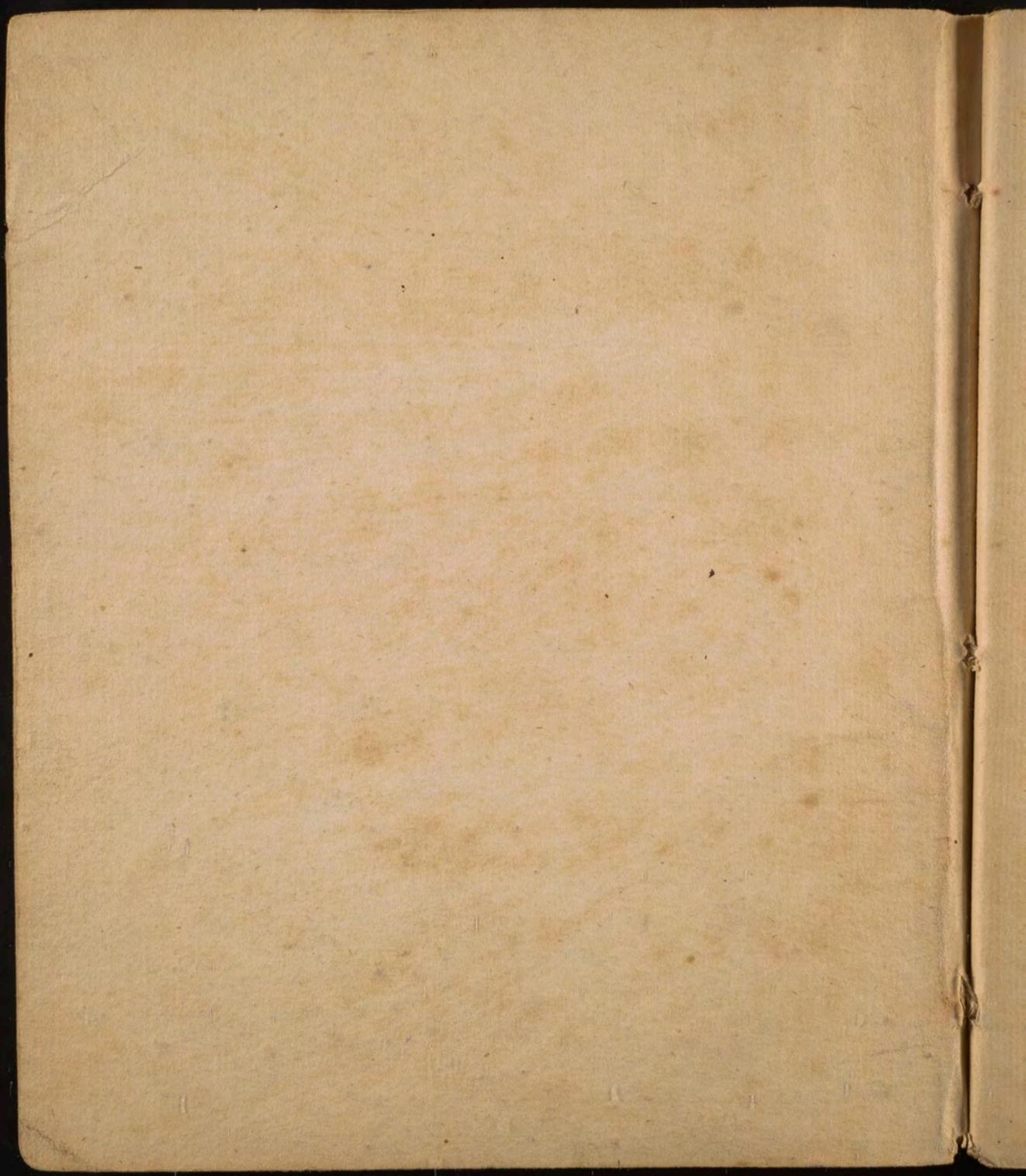


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16



of Digestion 621.
By the Cycle —
of the blood — 652.

✓ I shall first remark that the Stomach is a most important viscus, hence it is possessed by all animals. It is so full of nerves that it may be compared to the brain by fatigued excepted. So essential are its functions to life, that it has said the soul is seated in it. It is certainly the index of the state of the system in many diseases. It possesses a communication in health & sympathy in sickness. It is wonderful connection with every part of the body: in health as well as sickness - the veins - and blood vessels may even the mind are affected by it. - hence it should never be lost sight of a moment in inquiring investigating, & prescribing for diseases of those parts. Many diseases it is said enter the body thro' the medium of the

such parts of the mouth as to favour the action of the teeth upon it. It afterwards protrudes into the fauces from whence it passes by the tonsils - Vileum palatum & Epiglottis assisted by the action of a great number of small muscles into the Oesophagus - and from thence into the Stomach where it undergoes the process of digestion. ^{Solids} This more easily I believe than fluid.

of Digestion.

QUESTION In what manner is this performed? - The answer to this question shall be the business of our ^{inquiry.} ~~present lecture~~ — V

THE changes which the food undergoes in the Stomach previously

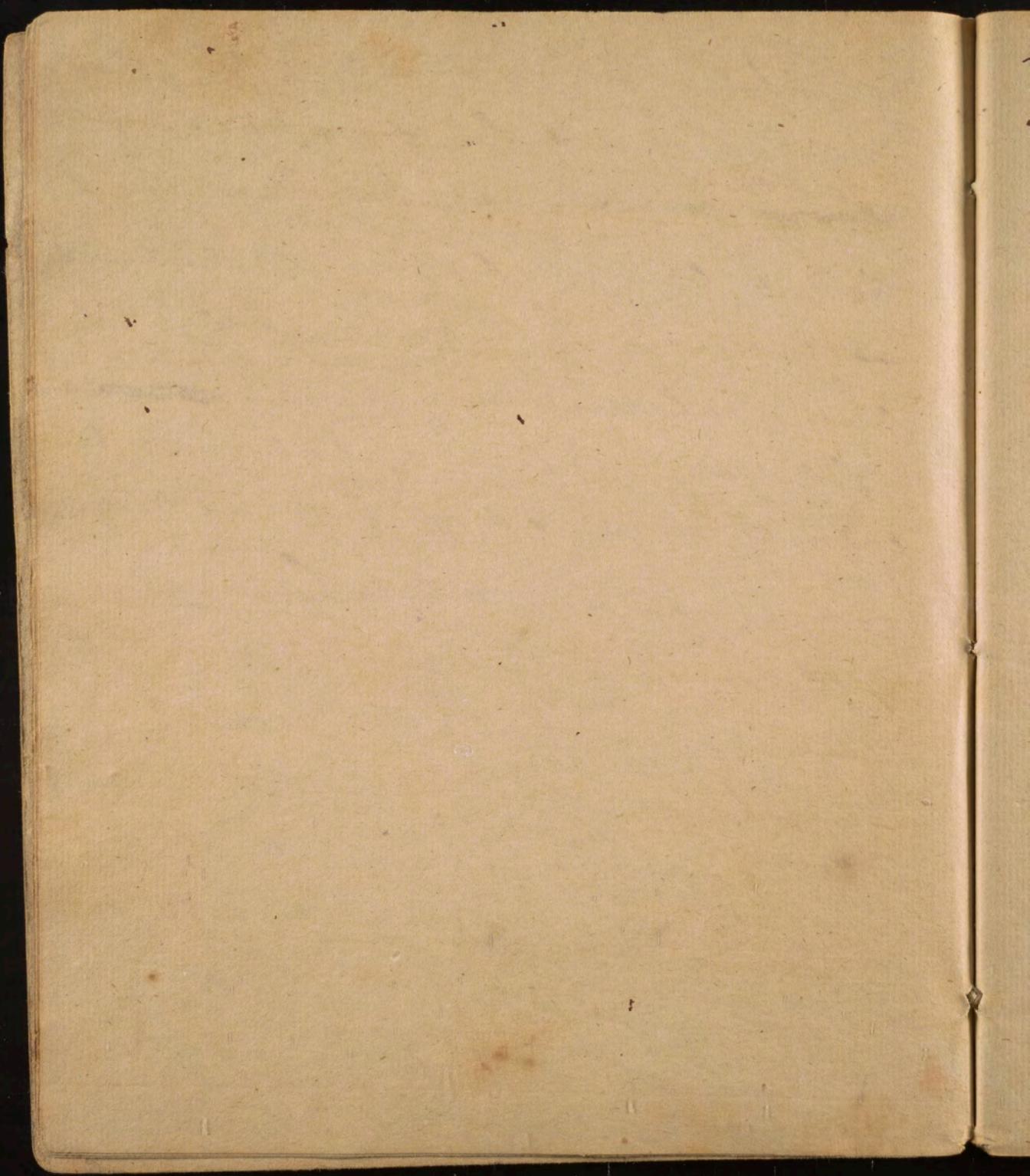
Stomach - still more I believe are
expelled from the body which act
primarily, & exclusively upon it. -
~~But to return~~ -

It is formed ~~as~~ like the teeth upon the
compound principles of carnivorous
& granivorous animals.

Its function is an important one
in the animal Economy. ~~As we behold~~
it something like what the Alchemists
have sought for in their crucibles - in
their attempts to obtain Gold from the
base metals - a power of changing the
most dissimilar heterogeneous matter
into a ~~water~~ substance which imparts
nourishment & life to the human
body. -

to its being converted into chyle, has been ascribed to the operation of two agents. These are 1 mechanical
~~agents~~ and 2 chemical. The mechanical
~~as~~ includes Intrivation only. The
 chemical includes ^{Putrefaction -}
heat - ~~putrefaction~~
Solution - and fermentation. Of
 each of which I shall treat in Order.

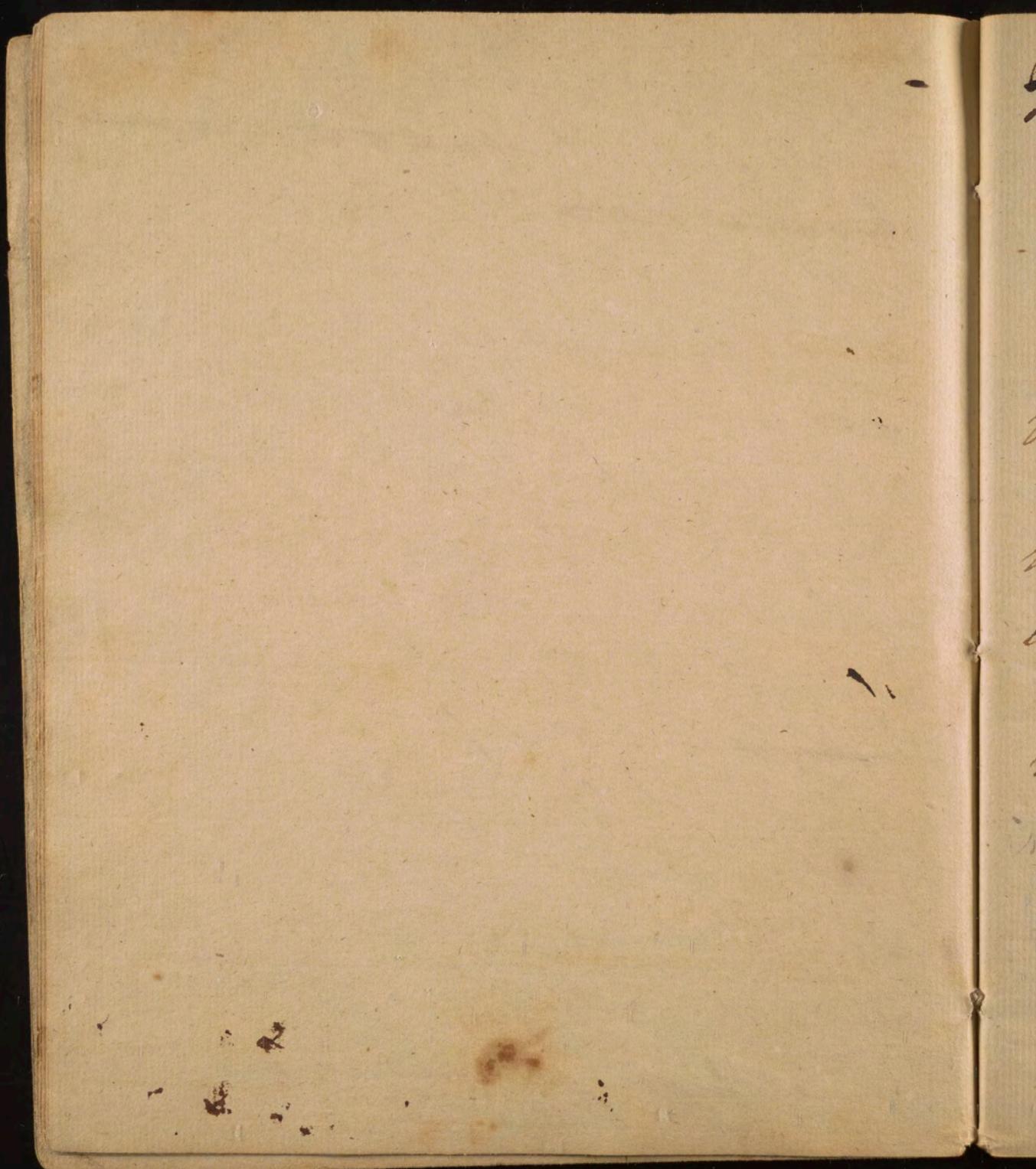
Much was ascribed to Intrivation
 by the mechanical physicians. Pit-
 -caiver has computed the force of the
 employed in digestion
 Stomach, to be equal to 12,951 pounds.
 Dr Boerhaave has enumerated all the
 forces which are ~~supposed~~ to act, in
 digestion - There are the muscular action
 of the stomach - the action of the
 Diaphragm in inspiration - and



even

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the constant pulsation of the Aorta
on the Stomach. ~~but nothing can~~
~~be said for~~ Dr Pitcairn's calculation
of the force of the Stomach does not
deserve to be contradicted, and the forces
~~are~~ enumerated, ~~by~~ Dr Burhaam,~~and~~
will appear to be very trifling from
the history of the following exp^t: made
by Ssabazarani. He swallowed 25
whole grapes - and discharged 18 of them
^{in an} ~~without~~ unbroken state. He swallowed
many whole cherries afterwards, most
of which he discharged in the same
sound state in which he took them.
The triturating force of the stomach
must be small indeed not to



~~have~~⁶²⁴ destroyed the texture of those tender fruits. We proceed next to inquire into the chemical Agents which have been supposed to be employed in digestion.

~~I reject~~ I reject putrefaction altogether from having any agency in digestion. On the contrary the putrefaction of the aliment unfit it so much for being converted into chyle - that when aliment which partakes of a putrid nature is received into the stomach it always exerts by the action of the gastric juice upon it. —

The ~~other~~^{other} agents which are concerned in digestion, I suppose to be, Heat & Solution. ~~the power of heat~~ ^{& another to benefit} hereafter.

Expt. of Slugs

Dr Spalaaruti has determined this by an accurate exp^t: - he exposed a slug with some flesh to a heat = to $\frac{1}{2}$ of $\frac{1}{2}$ human body - & the same quantity to a heat of the common air which was probably 20° degrees below it. The first putrefied in 12 hours - the last - in 2 or 3 days.)

Mr Hinter found that the digestion of a frog which went on at ~~65~~ 60° was effectually checked ~~at 60~~ when it fell to 35° or 40°. It is from the influence in part of heat that digestion goes forward more rapidly in warm blooded, than cold ^{blooded} animals. E.g. Dog - viper.

Heat is essential to digestion. The polypus employs 2 or 3 days in winter in digesting that food which it digests in 12 hours in summer. ~~without solution~~

~~as far as digestion~~ can take place ^{the} without it. The gastric juice which is the principal solvent of the element in the stomach possesses ~~no more~~ ^{no more} digesting power ~~at~~ in a heat of 44° or even 48° than common water. It is more active in a heat of 79° but its digesting power is greatest at 112° . V

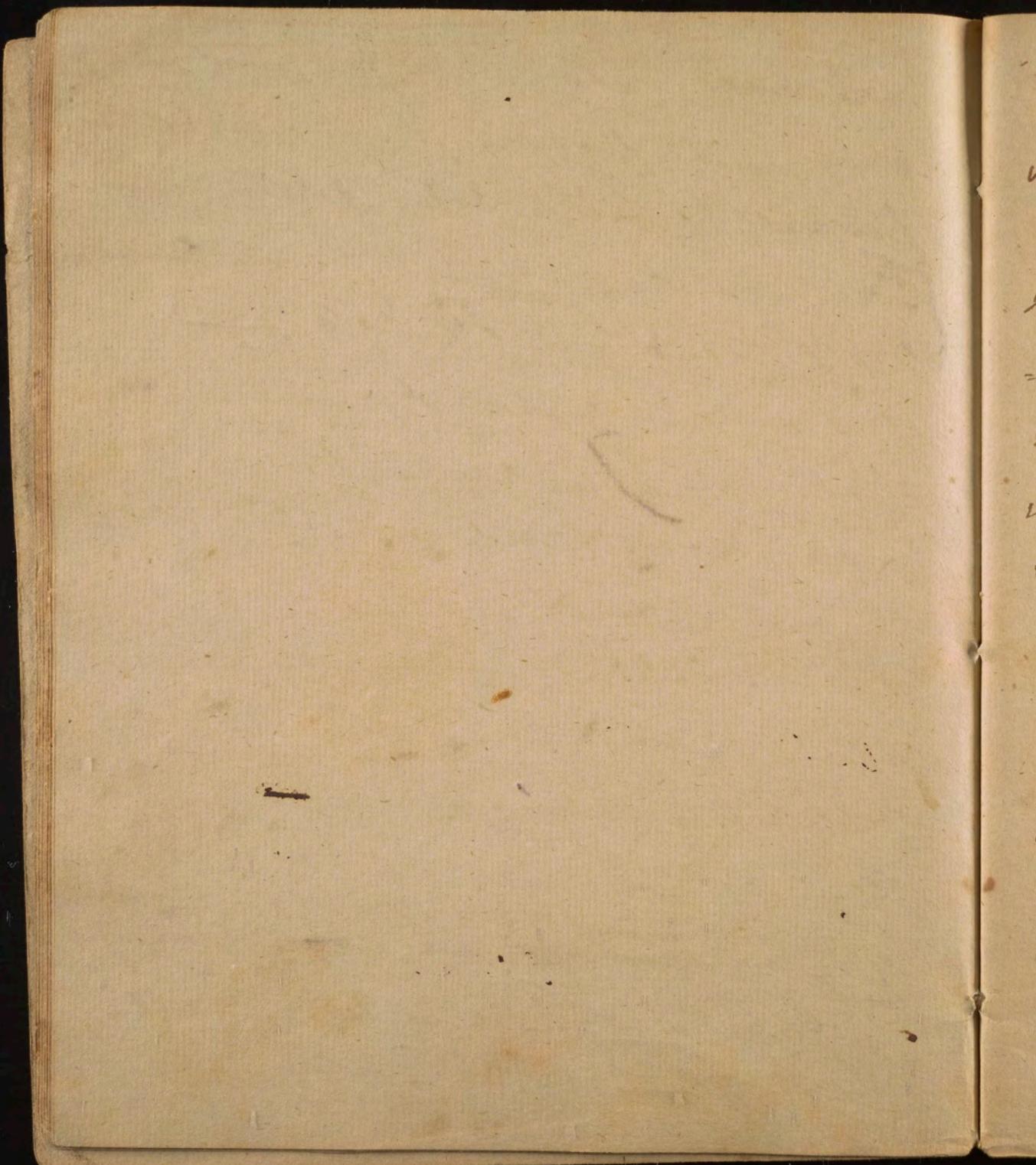
~~Heat is likewise essential to fermentation, and no degree is more favorable to an active and perfect fermentation than the heat of the human body.~~

The dissolving power of the saliva has
been established by ~~many~~^{many} experiments. ¹²³
~~all~~ of it are secreted in the course of
24 hours. It serves the ^{purpose} further it is
supposed of absorbing ~~oxygen~~ which
it conveys into the body. It has
neither taste, nor smell, and hence
~~it~~ it never impairs in its healthy
state either ~~one~~ of the powers of taste or
smell.

Solution is likewise essential to di-
gestion. The liquors which dissolve the
food, are, the Saliva, & the Gastric juice.

~~To decide the dispute between Dr. Galan-
zi & Dr. Pridie & Sir H. Parry, Jim one
of whom asserts that it dissolves the
other charts of the Gastric juice is the
most active of those liquors. It was not
the honor of Galanzi to have discovered
that the Gastric juice possessed a strong
dissolving power over animal & vegeta-
table substances by his experiments.~~

The same doctrine was established by
Distiller ^{many} before the time of Galan-
zi. This gas-
tric juice acts more or less in all
animals, but more in some of



them than others. — Those Animals
 which have grinders stand in the least
 need of it — for they divide the food in
 such a powerful manner that it after-
 wards requires but little solution in
 the Stomach. Its dissolving power is
 very great in the human stomach — here
 we find cartilages — tendons & even
 bones are dissolved by it as well as
 common flesh. — It is probably more
 abundant and more active in children
 & in old people than in ~~the~~ middle
 age, in order to supply the defect of
 mastication from the want of teeth.
 It acts most speedily upon all
^{I have said} food that
 is well masticated, and upon flesh

"V The presence of nervous influence
is indispensably necessary to digestion.

By cutting, or tying the <sup>8th pair of
nerves, digestion was destroyed in
a wolf & a dog, insomuch that
the contents of the stomach Dr.
Waller says became putrid soon
afterwards.</sup>

which is perfectly done or well cooked.
This has fully demonstrated by the exp:
of Dr Stomus v^t St Coix in his thesis
on digestion. —

This gastric juice has been said by
Inostander to dissolve the stomach after
death. It is possible this is sometimes the case
— but I am disposed to consider
what he calls a corrosion of the stomach
~~to~~ by this liquid to a destruction of
substances from inflammation & mortification.
Such appearances are very common
after death in all the bowels, where
we are sure the gastric juice concert
no ~~digestive~~ corroding power.

Spadanzani says he found diges-
tion to go forward after death, but not
a very full degree after the heat

✓ notice of this aid.

In addition to these powers, in promoting digestion, the influence of the ~~spiritual & physical~~ ~~whole~~ ~~nerve~~ system is necessary for this purpose - hence we find it impairs, ^{not only} depriving ^{the} sensations of the mind, ~~but~~ by all those accidents, and diseases, which divert ~~the nervous influence from it in short~~ ~~to supply the wants of the body~~ It is exclusively an animal power as much so as the formation of blood & semen, & never less & perhaps never can be initiated ~~out~~ of the body. go to p: 644 +

+ I beg this fact to be remembered. Ablstinence & low diet, founded on it. when we wish for the aid of all the powers of life, in curing a disease, let us ^{use} give them nothing to do in digesting a quantity of food, or food difficult of digestion. ^{plus} ~~or~~ manners.

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of the dead animal was dissipated. -

The Gastric Juice yields by a chemical analysis a large proportion of the animal Ammoniacal Salt - in which is contained the Phosphoric or animal acid. Take

The ~~physiologist~~ prophesied a power of curdling milk
This is evident by ~~the~~ ~~power~~ ~~to~~ ~~act~~ ~~on~~ ~~the~~ stomachs

of many young animals, particularly
children, calves, turkeys & fowls. But

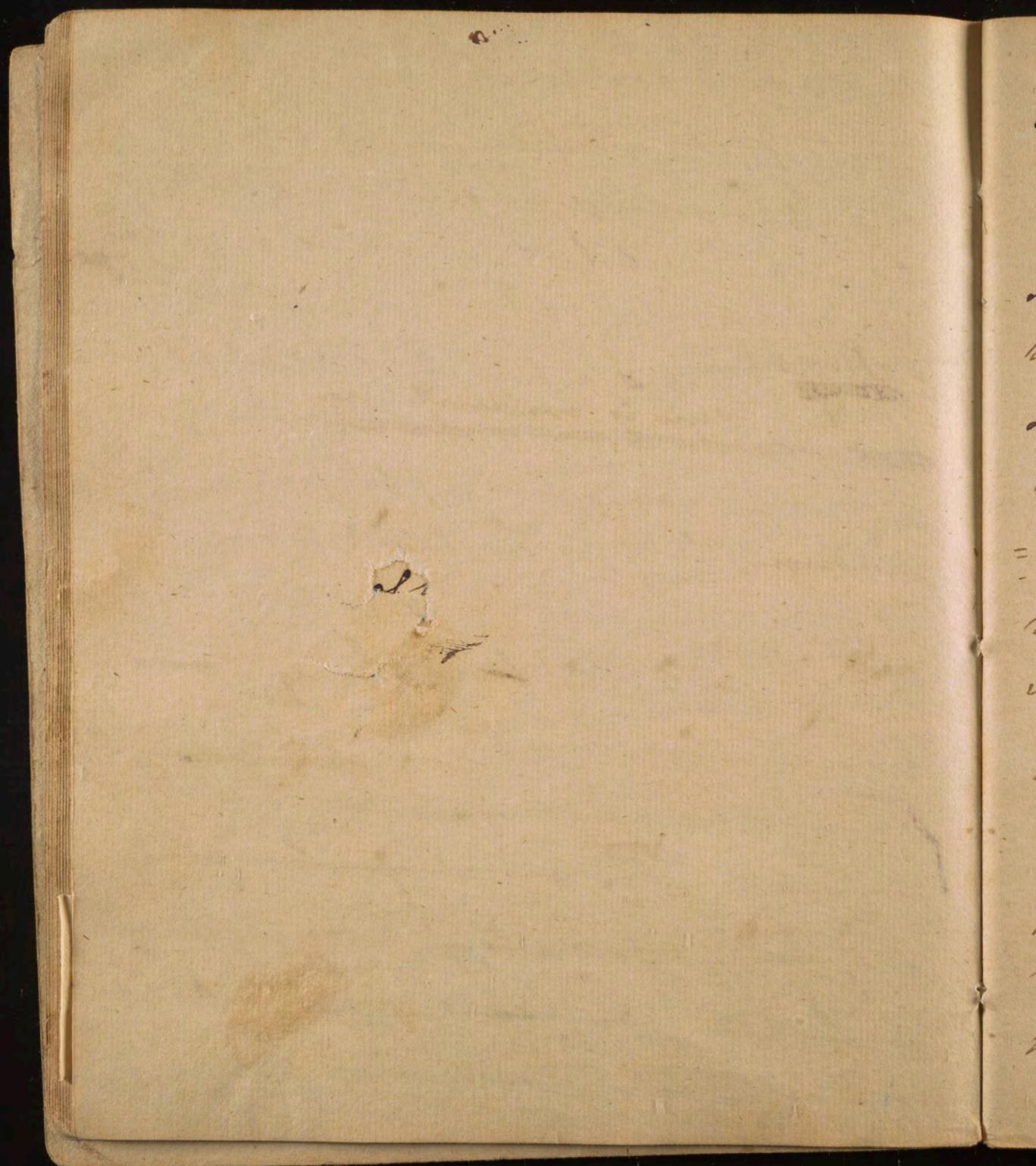
This power resides in other animal
substances as the ~~liver~~^{lungs} — and the
heart of a turkey. It resides in fish;

~~may cover it under the laws of
the state. I want to have facts~~

~~only two days in every fifth~~

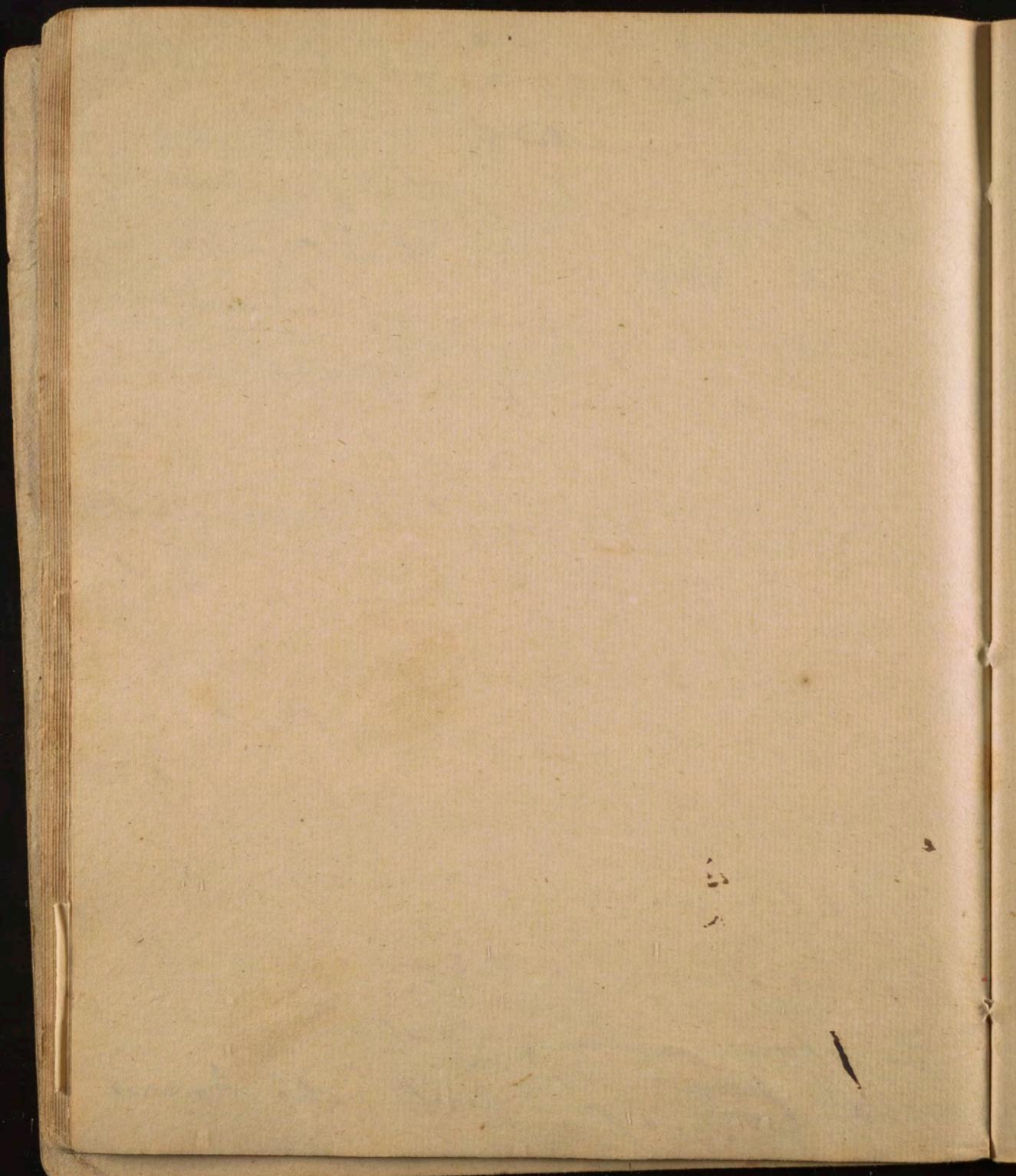
~~The list of all supplies
furnished to reside in~~

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juice, or that fermentation was
in a degree promoted by it. —

The aliment being thus prepared by
solution, undergoes a third change in
the Stomach by means of Fermentation.
I know this process to be digestion to be
rejected from the modern systems of Phy-
siology — I know too that there is as
much a fashion in opinions as there
is in drjs. I shall however still defend
fermentation as one of the causes
of digestion, not because I have like
Gil Blas written a book upon it, but
because I cannot account for all
the phenomena of digestion without
it. Such of you gent: who know



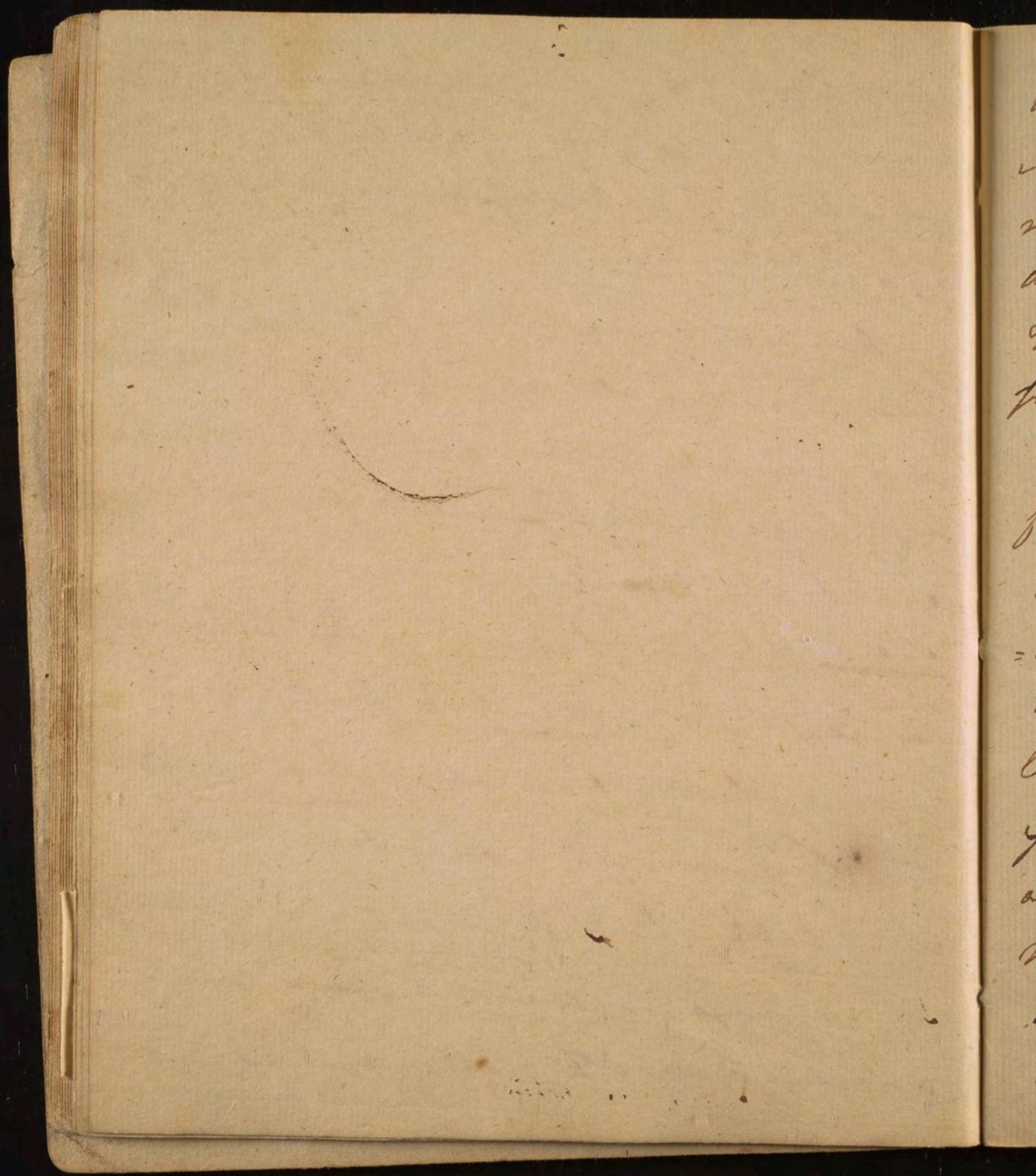
how many opinions which I once believed and taught - I have rejected in the course of the last ^{10 or 15} ~~20~~ years will not ause me of obstinacy upon this subject. — my weakness in the republis of medicine is of a very opposite nature. — It consists in a disposition to change ~~succinct~~^{meaning} ~~and~~ ^{to be willing} ~~desperately changing~~ my opinions. If this be a disorder in my mind, I hope no remedy will ever be discovered to remove it - for ~~so~~ I conceive that for ever to unlearn, instead of learning ^r ~~is~~ ^{is} the most certain & effectual ^r ~~form~~ ^{the only} way to come to a knowledge of the truth]. —

[By fermentation I mean that natural process by which ~~some~~ heterogeneous

on

matter are rendered homogeneous, so that a new product is obtained, wholly different from the original mass from which it was formed. —

Animal & vegetable - & even fossil substances are all capable of fermentation. — It is specifically different in each of those classes of matter. ^{when} For vegetable matters, undergo the ~~process~~ of fermentation, they ^{pass} ~~pass~~ thro' three stages - viz the vinous ~~an~~ acetic & ^aputrefactive state. It is uncertain whether animal matters pass thro' the vinous, - tho' some facts make it probable, - but it is certain that they undergo the acetic ~~state~~ and putrefactive states. Dr Haller informs us



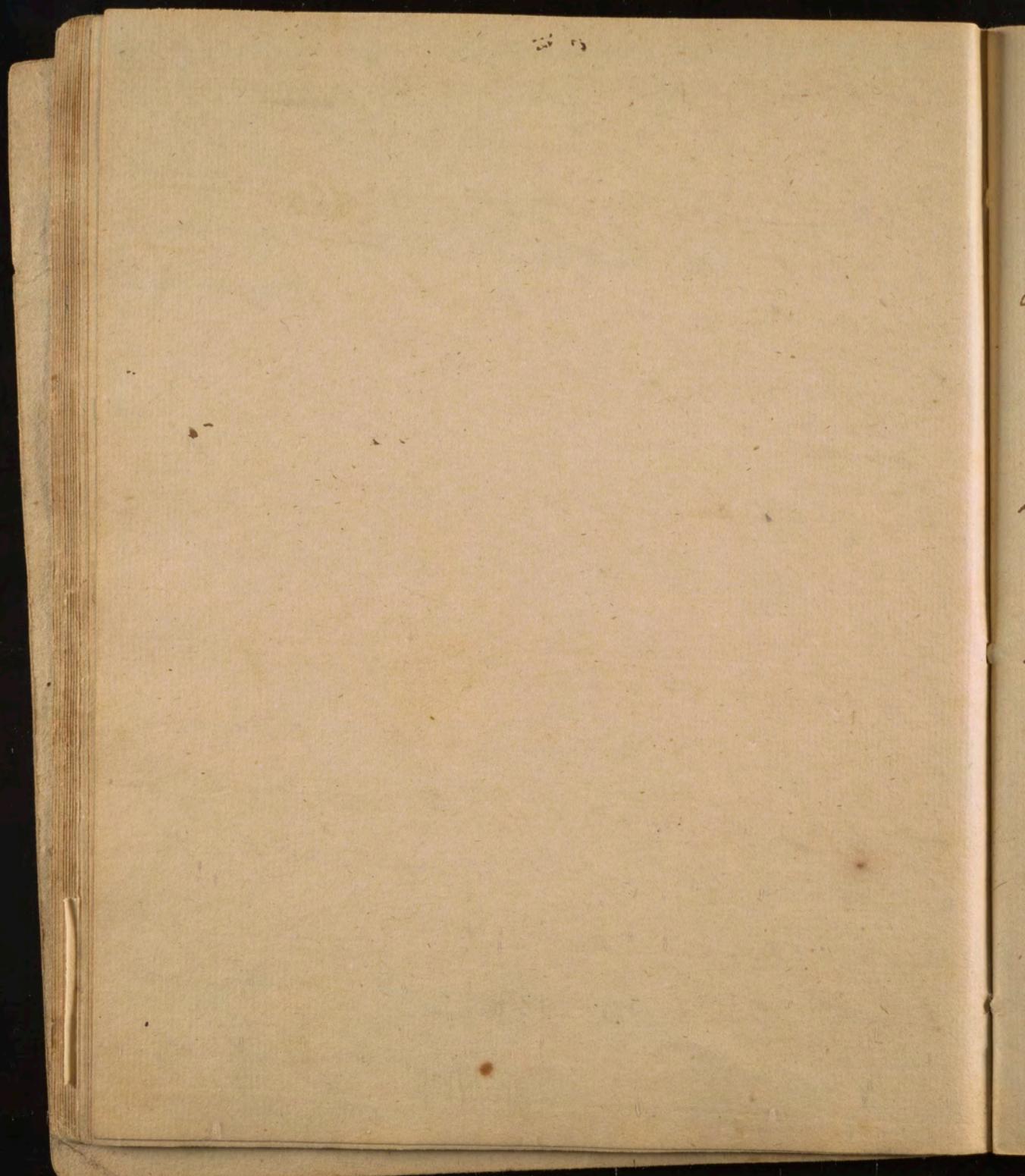
that he had distinctly perceived an acid smell
in meat, and Dr Thomas Smith informed
me that he distinctly perceived ^{of Birmingham} not only
an acid smell but an acid ~~taste~~^{taste} in a piece
of beef which he had kept two days in
summer. —

Your ~~lance~~ circumstances are necessary to
favour the fermentation I have described.

1 Heat from 72° to 112° are most favourable to it.

2 moisture: Sugar tho' it affords the
basis of fermentation in all vegetables,
yet may be kept in a sound state for
an ~~two~~ years provided it be kept free from
moisture. — 3 Air.

4 Rest - This is necessary to render all
the stages of fermentation regular.
Motion ^{when moderate} either prevents it altogether



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or burns it over suddenly to the acetous
or putrefactive stages. —

The fermentation of all ~~matter~~
capable of it is quickened by certain ~~sub-~~
called ferments.

Let us now inquire how far these
principles apply to the digestion of our
food.

1 Our Aliment consists of such sub-
stances as undergo the various - acetous
& putrefactive stages of fermentation
out of the body. —

2 The heat of the Stomach is highly
favourable to the fermentation of
the Aliment when received into the
Stomach. (3) our Aliment & Saliva are
both strongly impregnated with Air.

3 The Aliment impairs from Saliva -

and digestion is favoured by it.

✓ Dr Hanwood of Cambridge proved the
Advantages of rest after eating by the
following experiment. He gave two
pointers a hearty meal of flesh.
One rested - the other ran two hours
after eating. In the former all the
food was digested - in the other - it
was scarcely begun.

The state of the
air influences digestion. The inha-
-bilets of the ~~cow~~ ^{ch} ~~cows~~ ^{swines} of Swifex
= land digest the ~~greatest~~ ^{ch} ~~greatest~~ aliment
upon their mountains which
~~are so varied and gross that they can-~~
not digest them upon this plain,
return ~~gastro~~ p 648 ✓

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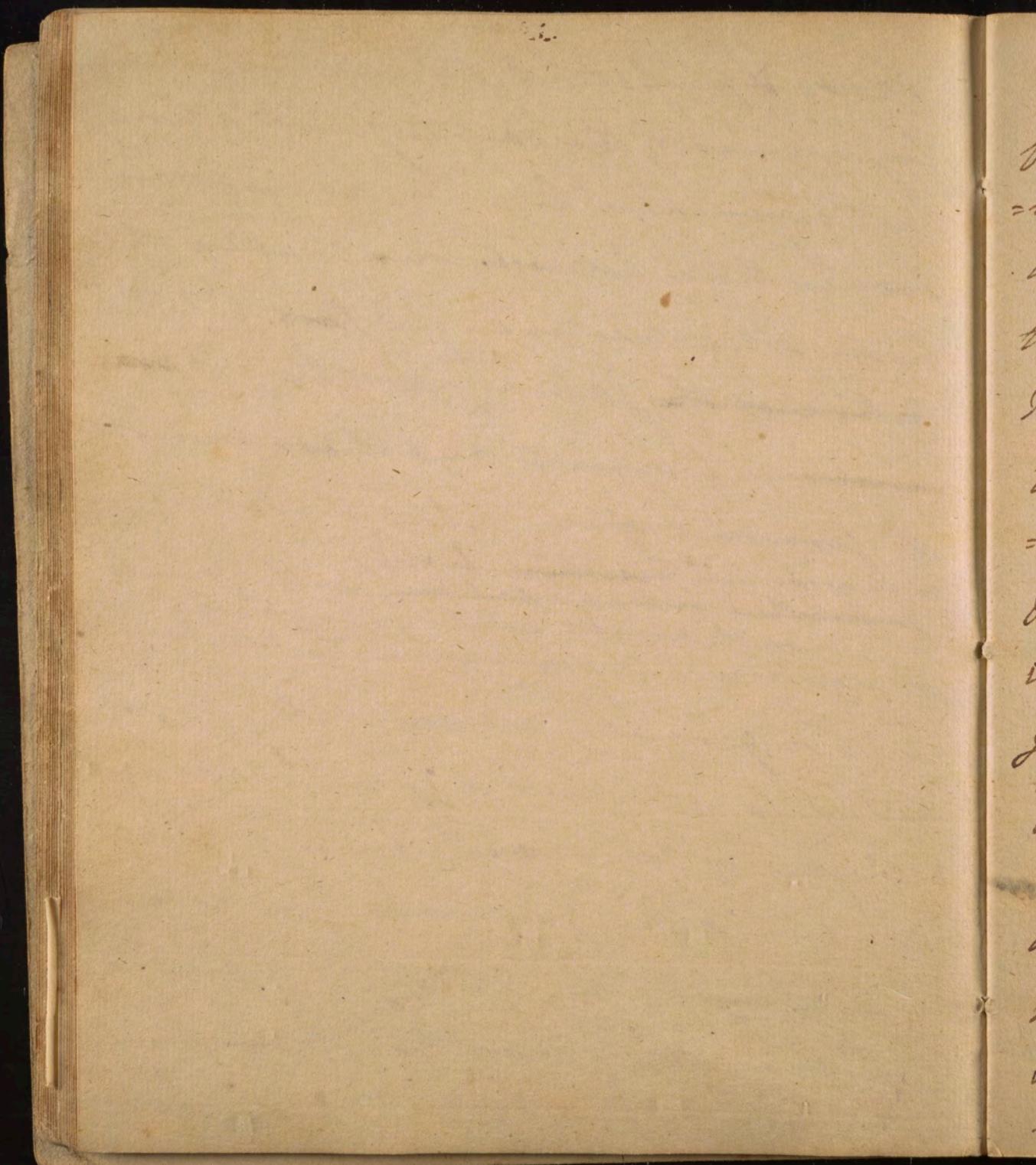
- gastripne - and the liquids, mix the
with our meals, sufficient all that
degree of moisture which is ample suffici-
-ent to promote its fermentation.

5 Digestion is always best promoted by
moderate ^{when greater than the capacity of the} rest. Motion ^{action of the} impairs it if ^{it is} and irrem.
after eating a heavy meal. → V

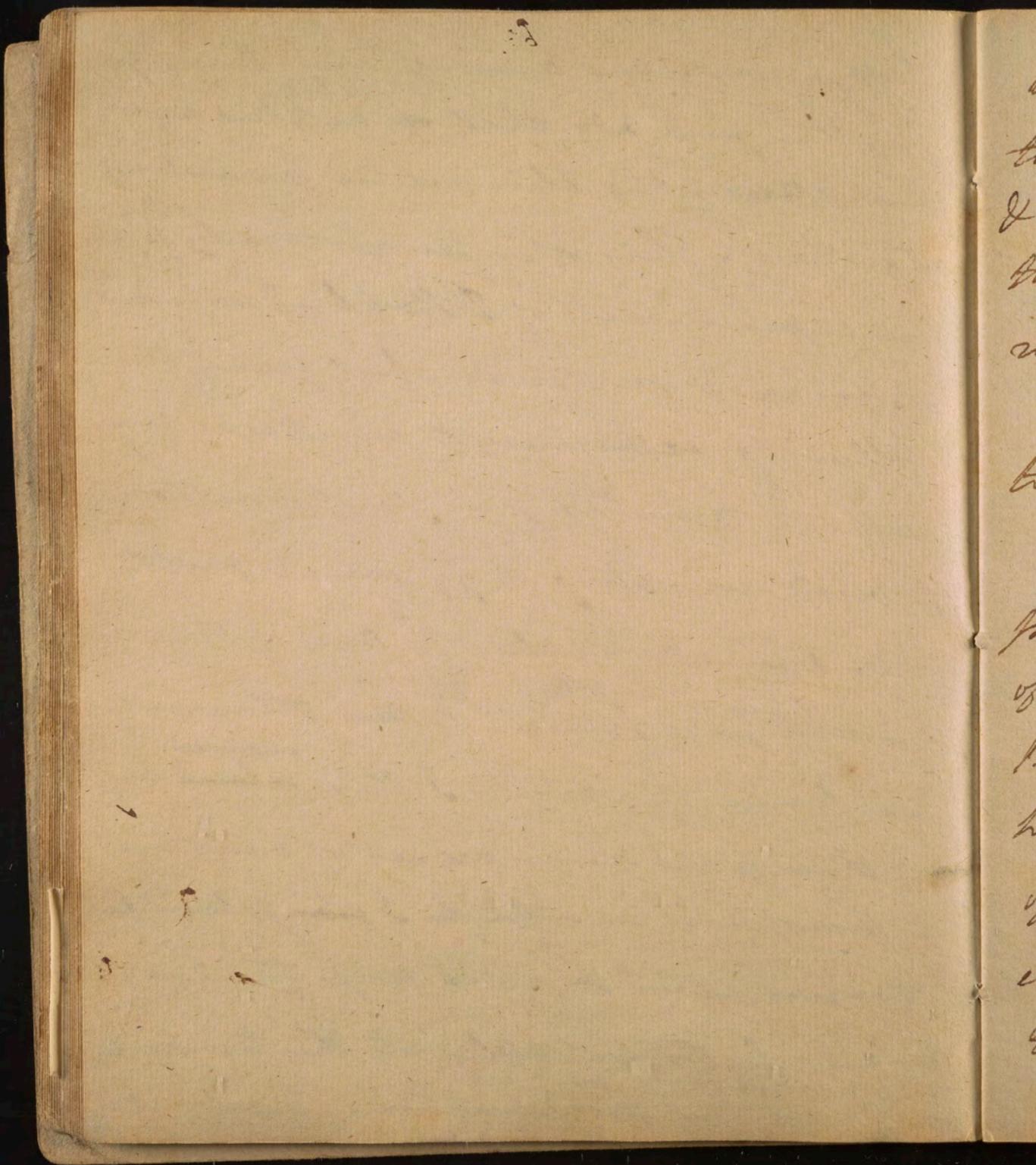
But it may be said that the expeditly
with which digestion is conducted in
the Stomach is too great for the slow
process of fermentation - tho' favoured by
all the circumstances which have been
mentioned. I should say occur in this
digestion does not observe two things
which are calculated to accelerate
it beyond its ordinary term of duration
out of the body. These are 1st its

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Speedy & perfect Solution in the stomach
by means of the gastric juice - now,
heterogeneous liquids, ferment much
sooner than heterogeneous matters of a
more solid nature. — ~~Book 2~~ ^{by} The
~~Action of the saliva upon the food~~ ^{acts} ~~as~~
~~under~~ a ferment and thus promotes
its fermentation. That the saliva is
a very essential Digestive liquor
~~promotes fermentation~~ in the process
of digestion ^{from the quantity excreted 3xii in a day & 2 br.}
being so generally attended with indigestion.
This is evident in great numbers
& chews of Tobacco — some years ago
a certain fruit gum was used as a
masticator by the nobility of Spain to
perfume their breath. It ~~did~~ produced
this effect, but it spread Dissipation,



& Hypochondriasis among them. But I go further, and add, that ^{the Saliva} it acts as a ferment upon the aliment in promoting digestion. This I infer not only from the experiments of D' Stahl, Boerhaave, Hoffmann & Mc Bride, - but from the following experiment made by myself. I took two pounds of mutton & bread - consisting of 3lb each & put them into separate vessels. To one of them I added ^{heating} 3p of Saliva - to the other half an Ounce of water. I then ^{exposed} placed each of them to the same degree of heat in a box of sand in which I had placed a thermometer so as to keep the heat as nearly as possible at the temperature of the human body. In five



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hours the mixture with the saliva began
to ferment, - in seven it became sour
& in twelve it became putrid, - while
the mixture with the simple water
remained unchanged for 20 hours.

I repeated this experiment a ^{2^d time - and with exactly the same issue.}

Thus far you: have I mentioned ~~any~~
presumptive arguments only in favor
of ~~digestion~~^a ferment being essential to digestion.
But I shall not leave the controversy
here. To decide it beyond all possibility
of contradiction, I tried the following
experiments - not upon Hawks - Cowz
Beagles - Dogs - cows - horses For even
upon Dr. Steven's Horses soldered, but

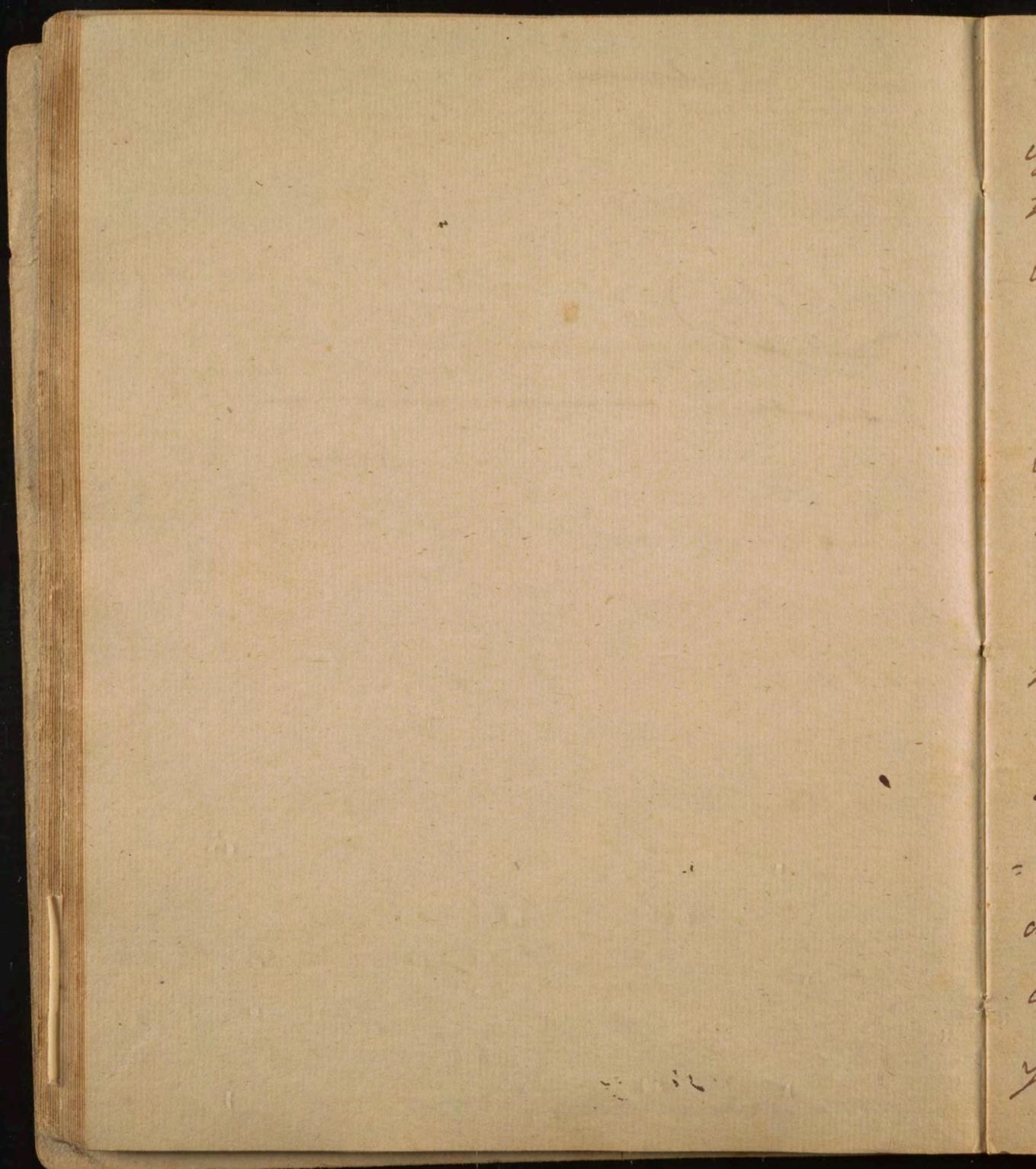
Ha

upon the ~~abdomen~~ of my own stomach,
at a time when I enjoyed the most
perfect health.

Exp^r 1,

Having first taken a few grains of Salt of F in
order to destroy any remains of an acid in my
~~stomach~~ dined upon Beef - bread - pease
& small meat - ~~beef~~ - three hours
Humbly after my last meal, I
dined upon Beef - bread - pease & small
meat. Three hours afterwards I took
two grains of Tart. Emet: & threw
up the contents of my stomach. They
were acid to the taste, & imparted a
red color to an infusion of a blue
flower. Exp^r: 2

Having taken Salt of F as before, I
dined on meat - bread & pease, & drank
water only with them. Three hours



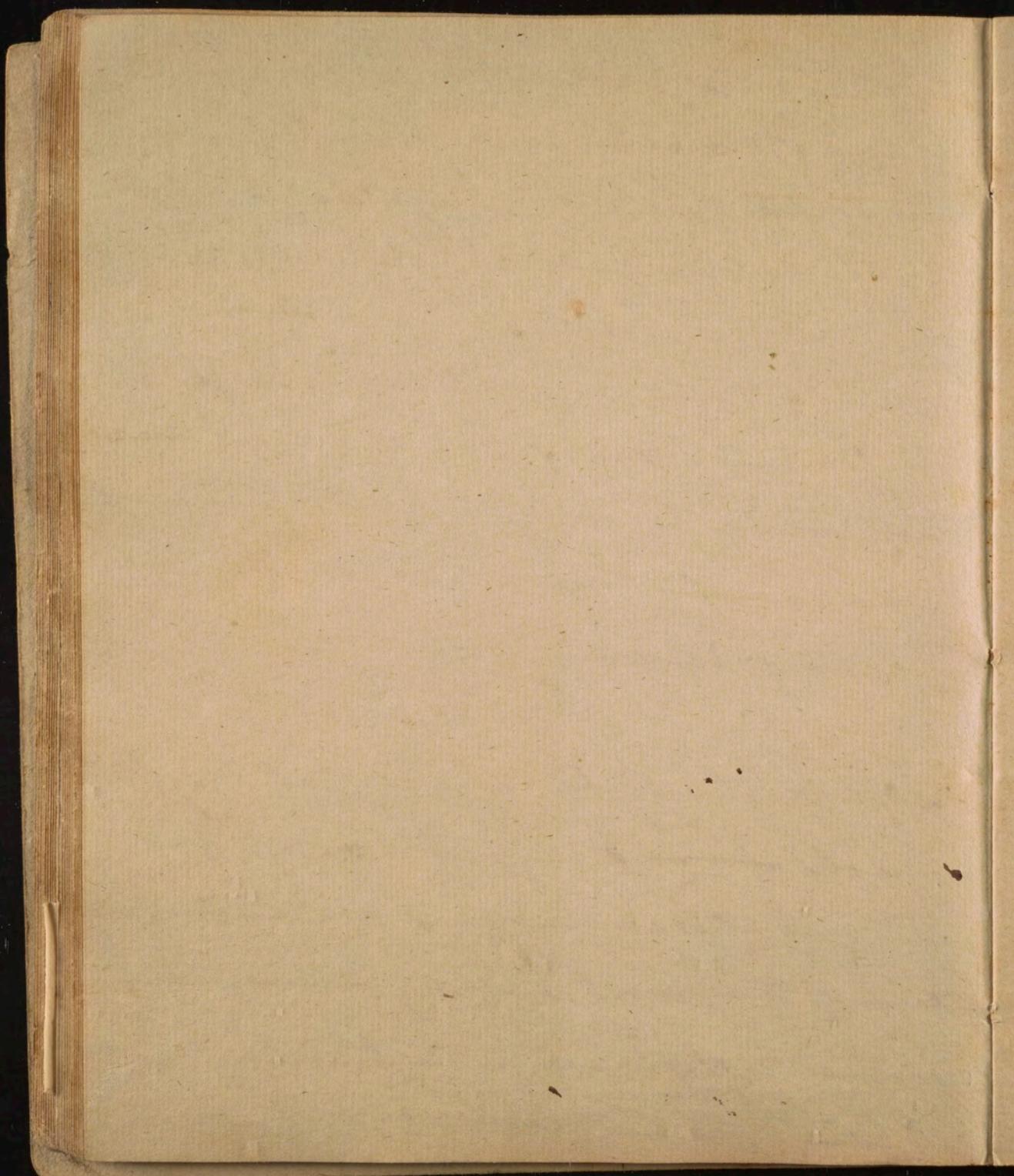
Afterwards I vomited. The contents
of my Stomach were sour, & produced
the same red color upon being mixed
with a blue vegetal ^{4.} infusion.

Expt 3.

Having dined on poultry - cabbage - and
unleavened bread, I took a vomit ^{at} ~~three~~
the usual hours afterwards. The vomit
was exactly the same as in the two
preceding experiments

Expt 4.

Lest it should be inferred that my sto-
-mach ^{was} ~~first~~ disordered - or possessed
an acid diosyncrasy - I consulted upon
one of the most healthy ~~young~~ ^{Dr. Penny}
young Englishman in the University
of Edin^r in the year 1767 to find me

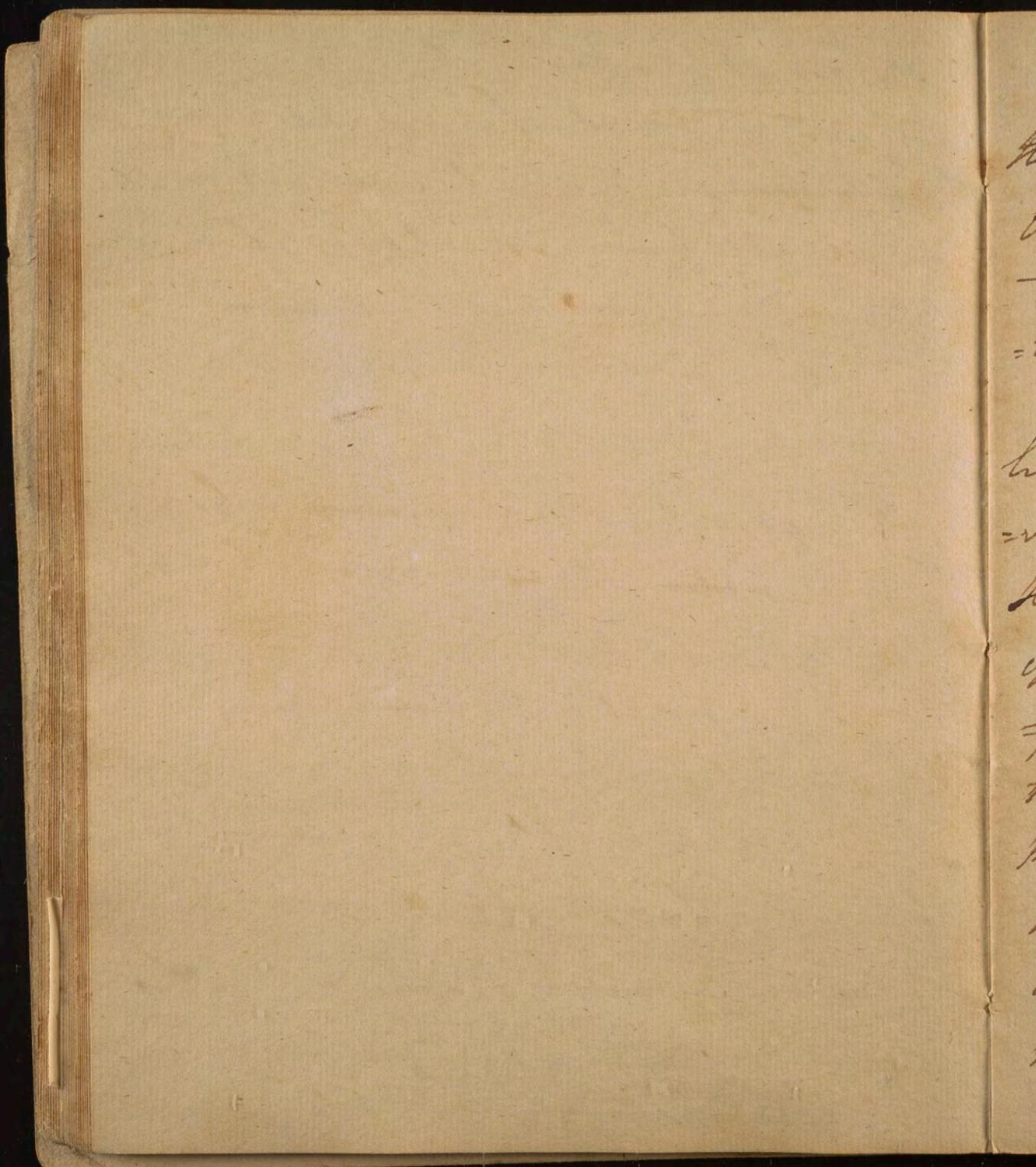


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the aid of his stomach in pursuing my inquiries into this subject. He dined with me on duck - beans - & drank small table beer with them. Thereupon afterwards he vomited. The liquor he discharged was sour - & imparted a red color to the blue vegetable infusion.

These experiments were made frequently repeated, & ~~also~~ sometimes varied - but always with the same issue. —

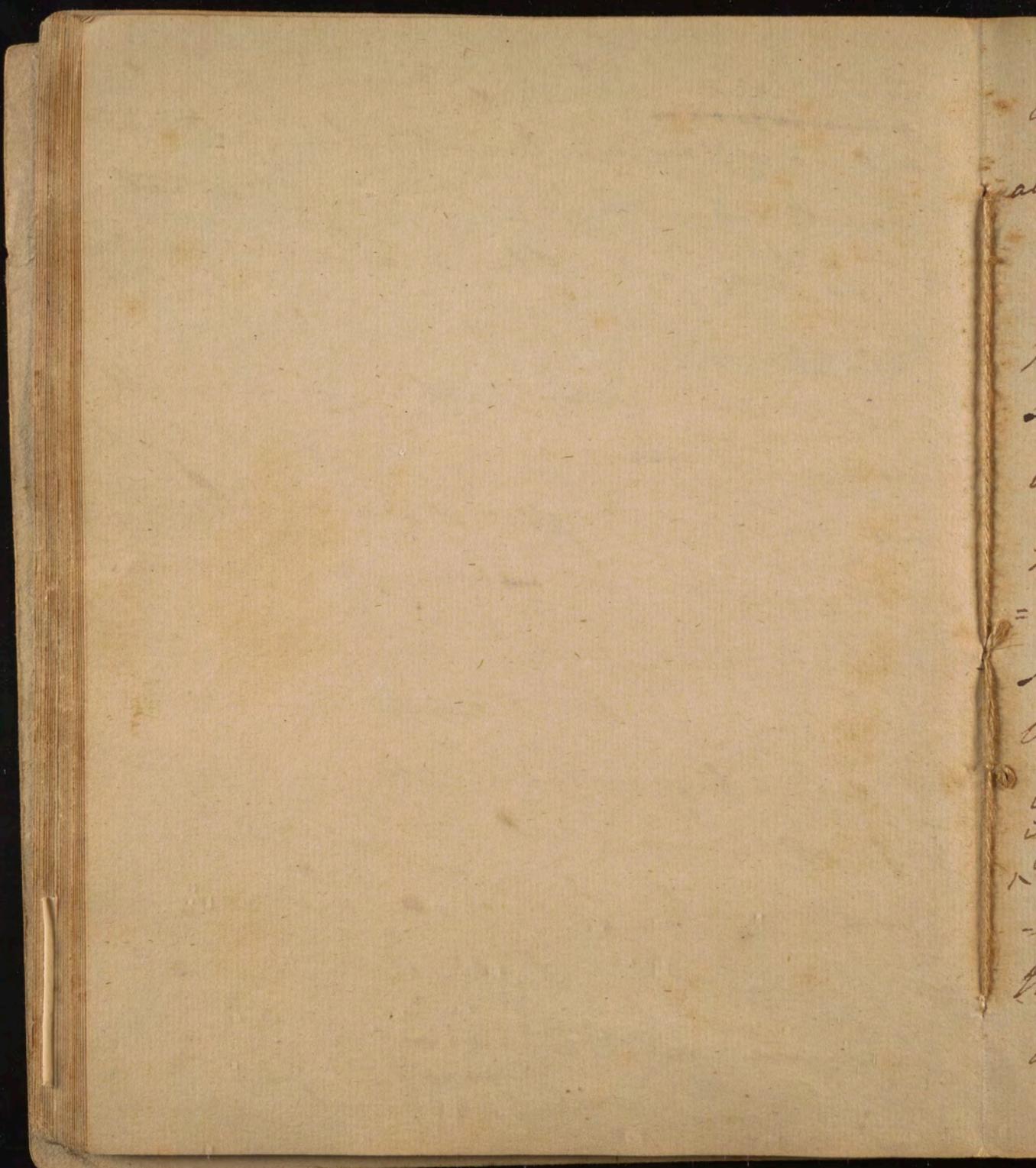
I know that great pains have been taken to discredit them by a report that I was not in health when ^{I made} took them. but this is begging the question. Mr. Gopse a German Physician who has lately written on digestion admits my ^{being in health} experiments, but ascribes the



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and liquor which I discharged to
the right ~~right~~ side of my Stomach being separated
from the Antimony in my Stomach.
This ^{operation} ~~case~~ is too absurd to be contradic-
-ted. —

I concur with Spalanzani in all
he says in favor of the wonderful disso-
lving power of the Gastric Juice - but
^{alone} solution will not exchange the nature
of Aliment, or produce any new com-
pound, - much less will can it produce
the same liquor from all the different
kinds of Aliment which are taken in
the Stomach. Is there a monstrum ^u
in Chemistry, - that produces exactly
the same compound when mixed
with every different metals - earths -
salts - & carbon?



I ask the question again - is there
 any analogy to the Gastric Juice in
 all nature - if we allow it to possess ^{not}
 only a dissolving - but an assimilating
 power - over the most heterogeneous
 substances with which it is obliged to
 unite in the stomach? ^{I answer there is not.} I beg pardon
 first for this challenge - I now recollect
 = but one - and but one analogy to it -
 It is found, not in the book of Nature,
 but in ancient fable - it is the ^{hand} stuff
 of midas which turned every thing
 it touched ^{into Gold} - And it differed only in per-
 forming this change more suddenly,
 than the Gastric Juice converts our
 Aliment into Chyle.

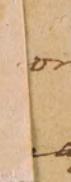
I think it probable that the

I conceive this air to be formed
necessarily, and to serve very im-
portant purposes in the animal
economy. —

In explaining particular functions
it is necessary to keep any eye upon all
~~processes wh: go forward whole in every part of the body,~~
~~the functions of the body~~ — Otherwise we
shall make as great mistakes as Physi-
-ologists, as those Physicians make who
prescribe for Symptoms only in a disease
without regarding the state of the ^{"whole} system.

digestion in a healthy state always
 ceases as soon as an acid is evolved
 from the Aliment. ^{The} Acid ~~less~~
 we find in the animal salt, and
 afterwards becomes a basis of phos-
 phorus - ~~the acid vanishes~~ appears to be formed
~~from it.~~
~~and~~ It is the ^{Absence of this acid} probably
 which produces the ferruginous & its prodo-
 minance which forms the nucleus
 of the stone. It exists in a material
 only - and not in a formal state
 after it leaves the stomach, for it is
^{covered} ~~covered~~, after it is changed into Chyle
 so as to not to be ^{discovered} ~~perceptible by~~ discovered
 the common tests of acids. It

Thus have I delivered my opinion
 upon the subject of digestion - nor shall
 I yield it to Spallanzani - Stevens -

For ~~now~~ detailing the facts & exp^t: in
favor of fermentation taking place in
the stomach, I have not availed myself
of the last ~~act~~, from the air & acid humor
which are often discharged from the
stomach in digestion - for I consider them
~~when~~  forbidding phenomena, to be
explained ~~often, when they~~ depending
upon a relaxation of the stomach, and
an exp^t in the fermentative process.

~~or gose & untill they have taken
as many pubes as I have done, to
establish their postures they have
given to the world.~~

✓ There is but one exp^r wanting
~~to establish~~ to establish the my theory - & i.e to ex-
-amine by distillation whether the con-
-tents of the Stomach will yield by distil-
-lation a Vinous Spirit. — If they should,
it would pre^r fermentation in the
Stomach ^{one of} as the cause of digestion be-
-yond all possibility of being doubted.]

#. I shall now add a few Observations
upon the phenomena which go for-
ward in digestion. —

1 There is after every full meal
a slight fever. It is sometimes ushered

Dr Brown's exp^s, which
undeservement^a highly
probable. He died in 1802
with yellow fever before
he had completed his
exp^s.

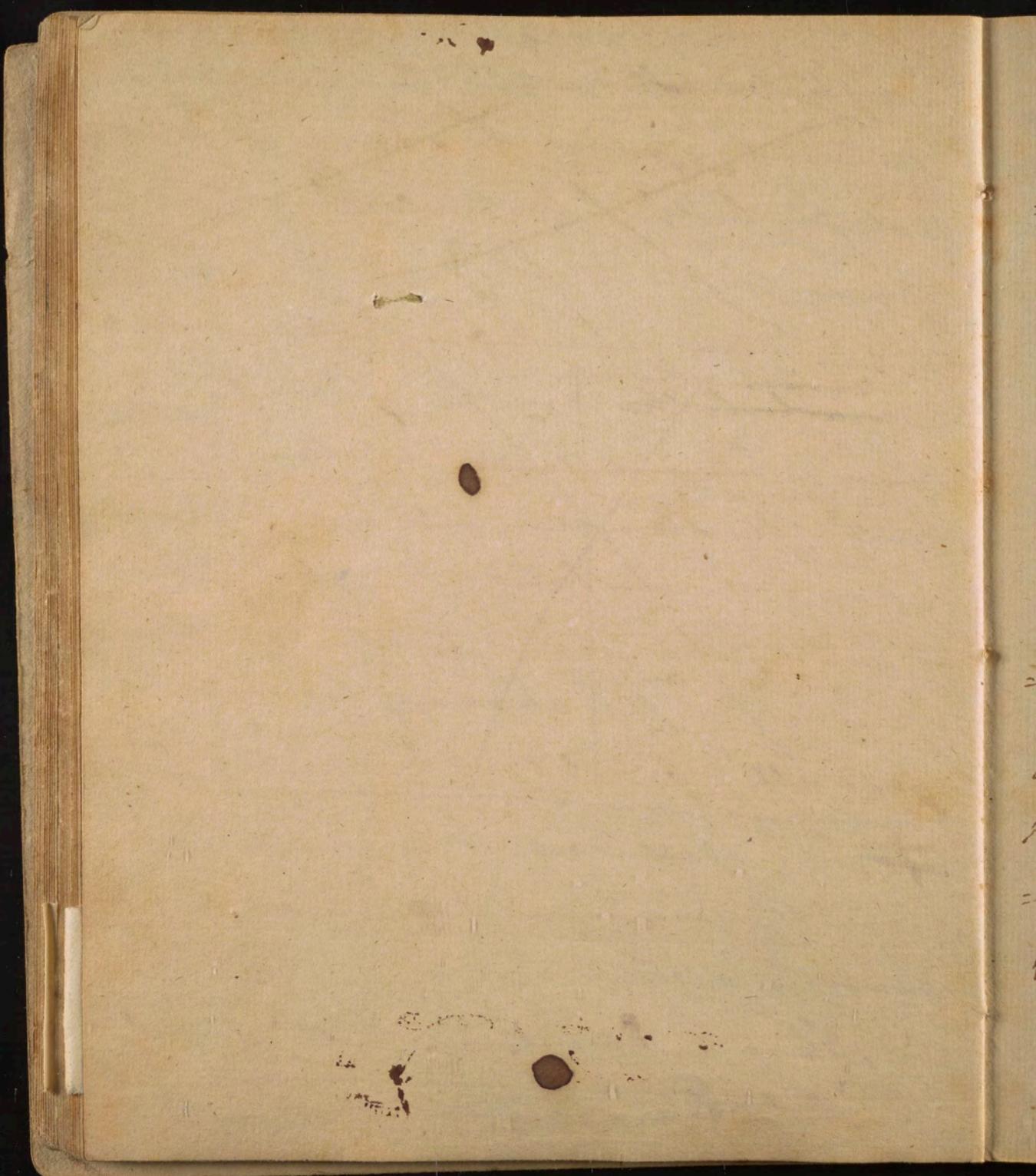
A Dog was killed his body opened and a thread tied round the Duodenum just below the pylorus, the duodenum and oesophagus were then cut off the stomach immediately taken out & nearly all the gastric juice poured out, it was then filled with dough made of wheat flour & water & covered over in warm sand, of in which Drarenheit Sherman the stood at 96° with the divided end of the oesophagus just above the surface of the sand, in this situation any change which might take place in the dough would be easily observed, a piece of dough was moistened with water & covered in the sand by the side of the stomach, by way of comparison - in two hours & three quarters a very active fermentation was observed in the stomach - the dough worked up & run out of the oesophagus - no change in the dough in the sand

Experiment 2)

A Cat was next killed & the stomach taken out as quick as possible to prevent it from cooking - the thread & other precautions to save the gastric juice was neglected & the stomach immediately covered in the sand & a lump of dough about the size of a walnut put in the stomach & the same quantity put in a vial containing a small quantity of water in one hour & twenty minutes there was a considerable motion in the stomach & the dough worked up three fourths of an inch above the end of the oesophagus - no change in the dough in the phial -

Experiment 3)

Another Cat was killed & the stomach taken out this stomach contained a large quantity table spoon full of the gastric juice about two thirds of which was poured out into a phial - equal parts of dough was put into the stomach & phial - the phial was used by way of comparison - in one hour & twenty five minutes the dough in the stomach shew signs of fermentation the working increased & in 4 hours the fermentation was so considerable as to force $\frac{2}{3}$ of the dough out of the stomach - it was compared by a bystander to the working of a barrel of cider - the motion continued until 6 hours at which time the sand was suffered to cool - not the least signs of change or motion appeared in the dough in the phial



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in with a slight degree of chilblain,
and in weakly people it is often accom-
panied with a gentle sweat. This fever
is occasioned by the stimulus of ~~affection~~
meal being overproportioned to the
excitability of the system produced by
hunger. — It is not necessarily con-
nected with eating — nor is it pro-
duced after a slender meal. The know-
ledge of however of the existence of this
fever, may be applied to several useful
purposes. — It should lead us to recom-
mend a plentiful meal to all persons
who are about to be exposed to the
cold in ^{a situation in} ~~expectation of~~ which they
cannot use exercise ^{much} ~~for a small~~

v for the time is prof yet come when
philosophy can add either war, or
government.

pamphlet which I published during
 my attendance on the military hospitals
~~for~~ entitled "Directions for preserving
 the health of soldiers" I recommend
 in strong ~~4~~ terms that a soldier
 should never do the duty of a sentinel
 in cold weather, but after a ~~full~~
~~meal.~~ ~~but I am sorry to say that this advice~~
~~is not often followed~~
 2 There is frequently a disposition to
sleep after a full meal. This is owing
 to the stimulus of the food producing
 depression in the brain ~~comatose~~, or the
~~stimulus of the~~ ~~tending to the~~
~~healthy appetite~~
~~It is most commonly removed~~
 by the additional stimulus of
 tobacco in the form of snuff or
 cigars or by a few glasses of wine.

82

This flippiness is not necessarily connected with eating. It never succeeds a moderate meal. Lewis C ornaro tells us that after he adopted ~~the~~^{the} new & temperate mode of living ^{W:} ~~he~~ restored his health, & prolonged his life to the most extreme old age, he found no disposition to sleep after eating.

3 The mental faculties are generally affected by a full meal. But this likewise does not follow a temperate repast. Lewis Cornaro used to ~~exchange~~^{exchange} ~~knifed forth~~ his ~~table~~ for a book, or his pen & ink, & never found any inconvenience from it after he began to live a life conformable

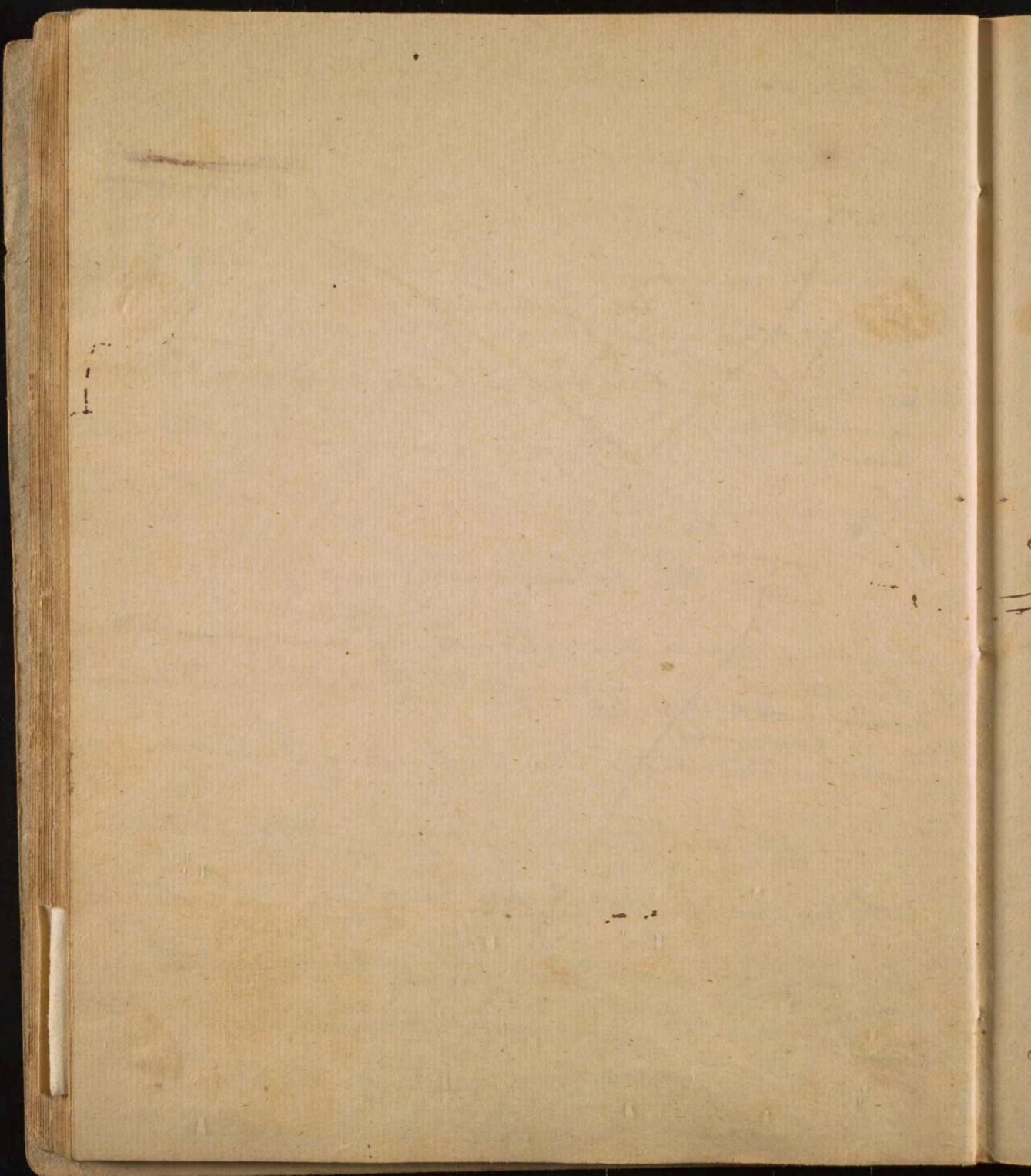
6
V. The food generally lies from 1 to 7 hours
in the stomach according as it is more or less
~~so~~ easy of digestion. Its time is from 13 to
hours ^{as it is} ~~and~~ during ^{time is from 13 to} five
hours ^{as it is} ~~and~~ shall hereafter mention
instances of ~~long~~ ^{little} substances lying
days - weeks - months & even years in the
stomach without being digested. p. 649 =)

to reason & nature. —

4 There is generally a disposition to rest after a plentiful meal, ~~rest~~

D'Uamoroff of Cambridge proved the advantages of rest ^{in suspending digestion} by the following experiment. He gave two pointers a hearty meal of flesh. One rested; — the other ran two hours after eating. He then killed them both. In the former all the food was digested; in the latter it was scarcely begun.

5 The state of the air influences digestion. The inhabitants of Switzerland digest aliment upon their mountains which they cannot digest in their valleys, nor upon their plains. ^V



649

~~disease, without enjoining my patients
to make six or seven small meals,
instead of two or three large ones in
a day. There are many instances
of fevers - & some of sudden death
of apoplexies & palsies following full
meals, in persons of delicate health
and cases of sudden death from the
same cause. I have said~~

=17 The passions have a great influence
upon the digestion of the food. It is invi-
gorated by cheerful cuffs - hence we feel
but inconvenience from full meals
which are followed by cheerful con-
versation. ~~The passions~~ ~~excite~~
It is retarded by grief - fear - and
shame - The passions seem to act
only upon the muscular fibres of

✓ Is there not a proportionate afflux
of the Electroic fluid of the nerves
to the stomach which accelerates
the fermentative process, & thus im-
pairs the digestion? It seems probable
from an exp^r related by Dr Johnson.
If the 8th pair of nerves which goes to
the stomach be divided, digestion is
immediately interrupted, & the food
settles on the nature of feces in the
stomach.

✓ You some of you will perceive
gent. I have observed rejected ferment^t
forming one of the causes of the

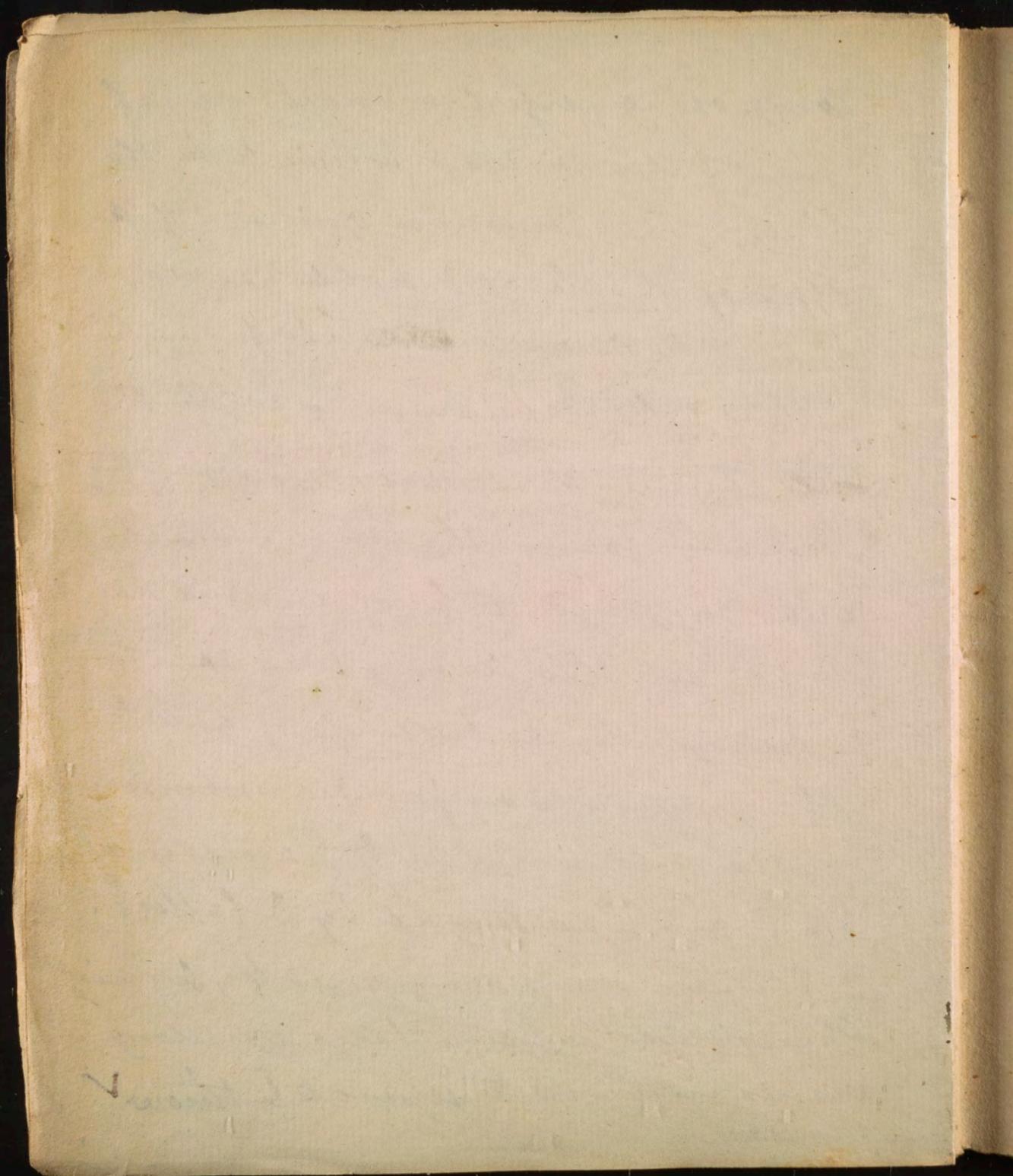
of the Stomach. In the former case the Stomach is assisted in propelling the aliment after it is digested into the Pylorus; - in this ^{latter} case, the debility of the Stomach induced by the relaxing spasms prevents its acting with its usual force in throwing the food out of the Stomach.

The Aliment ~~when~~^{when} it is digested is called Chyme. After it passes into the Duodenum it is mixed with the bile. The cystic bile is said to ~~which~~^{said to} precipitates its fecal parts from it, and imparts to them its peculiar color. It is now called Chyle.

I have thus mentioned the means by which Chyle is formed by the Stomach, but it requires the aid of another viscus to render it fit for

V off certain experimental matters
from the blood. In answer to the ^{king of France} opinion,
I shall only say the ⁱⁿ nature and in answer to
Leydig's ^{not of acid} ~~composition~~
the world, I shall ~~now~~ now ~~lay~~ lay before you
~~and do it~~ ~~now~~ ~~now~~ ~~now~~ ~~now~~ some facts intended to prove that the liver serves a
much higher purpose than to discharge ~~waste~~
~~any~~ anything of a fecal nature
from the blood. go to account of the
liver p: 16.

composing perfect animal nourish-
ment. This visus I believe to be the
Liver. The common opinion of the
Office of this large & noble visus is
that it is intended ~~for~~¹ to furnish
a fluid which by mixing with the
~~hot~~ Chyme that descends from the
Stomach forms the Chyle. The Chyme
was supposed to be of an Acid na-
ture, and this acidity was said to
be destroyed by the bitterness of the bile.
This opinion was founded upon some
experiments made by Dr Ramsay of
Edin^r and was taught by Dr Cullen.
2 The Liver was supposed by some
Physiologists to be a large excretory
visus intended to separate & throw^V



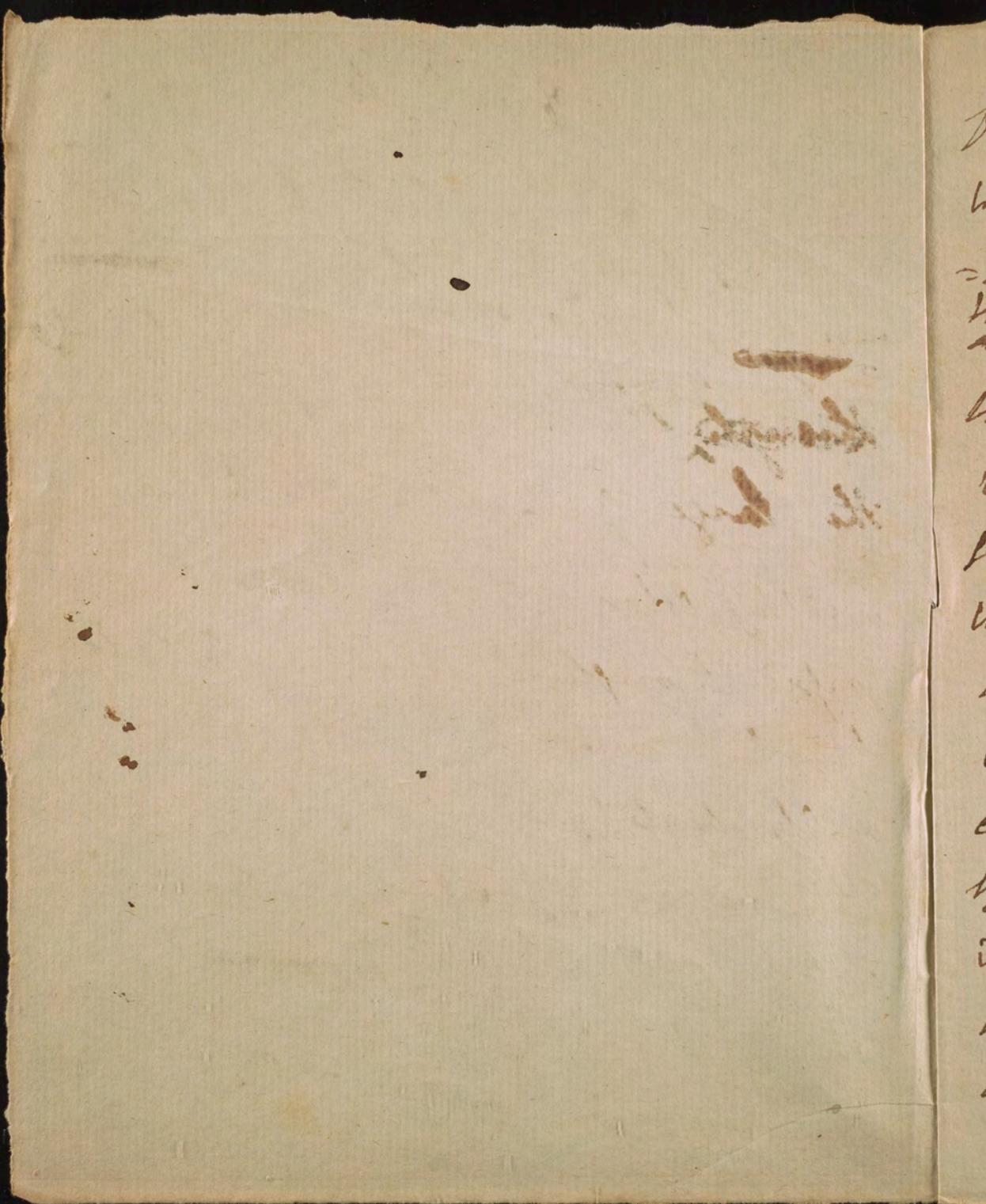
of the Lymphatics or Absorbing system.

Upon this subject you are not to expect a minute detail of all the opinions & controversies which ~~exist~~ are to be found in books. ~~such a detail would be~~
as useless, as it would be tedious. I shall relate only such facts ~~& principles~~ as appear to be true, and deduce such principles only, as ~~do~~ admit of being applied to pathology & the practice of Physic. —

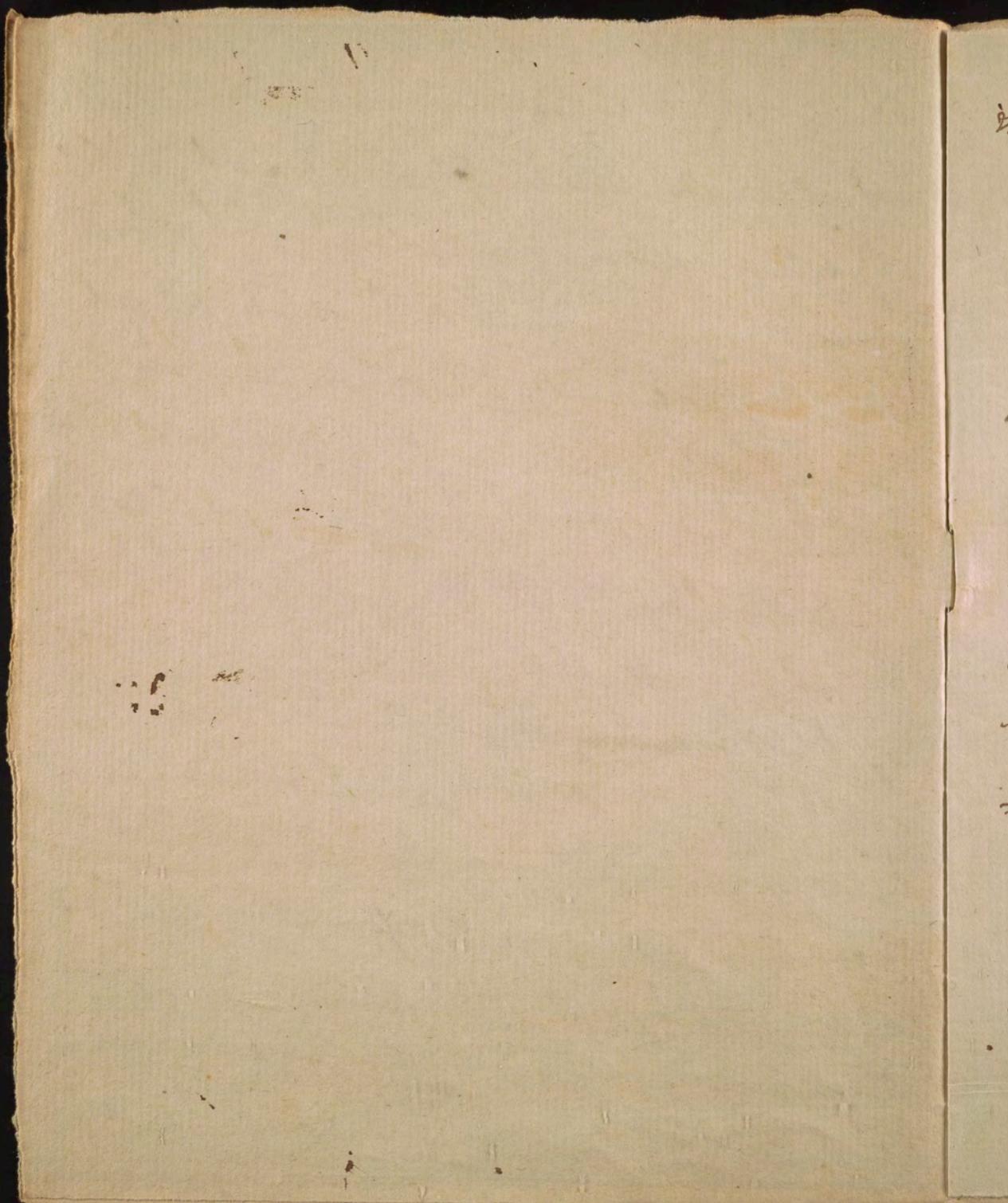
By the Absorbing system is meant the Lacteal as well as Lymphatic vessels. They are alike in so many particulars, ^{that} they have been designated by one name. They both open into cavities of the body — they have the same structure — they, ⁱⁿ ~~but~~ ^{the} have this ~~is~~ glands in some cases,

of the Chyle p: 654 before
Lymphatics.

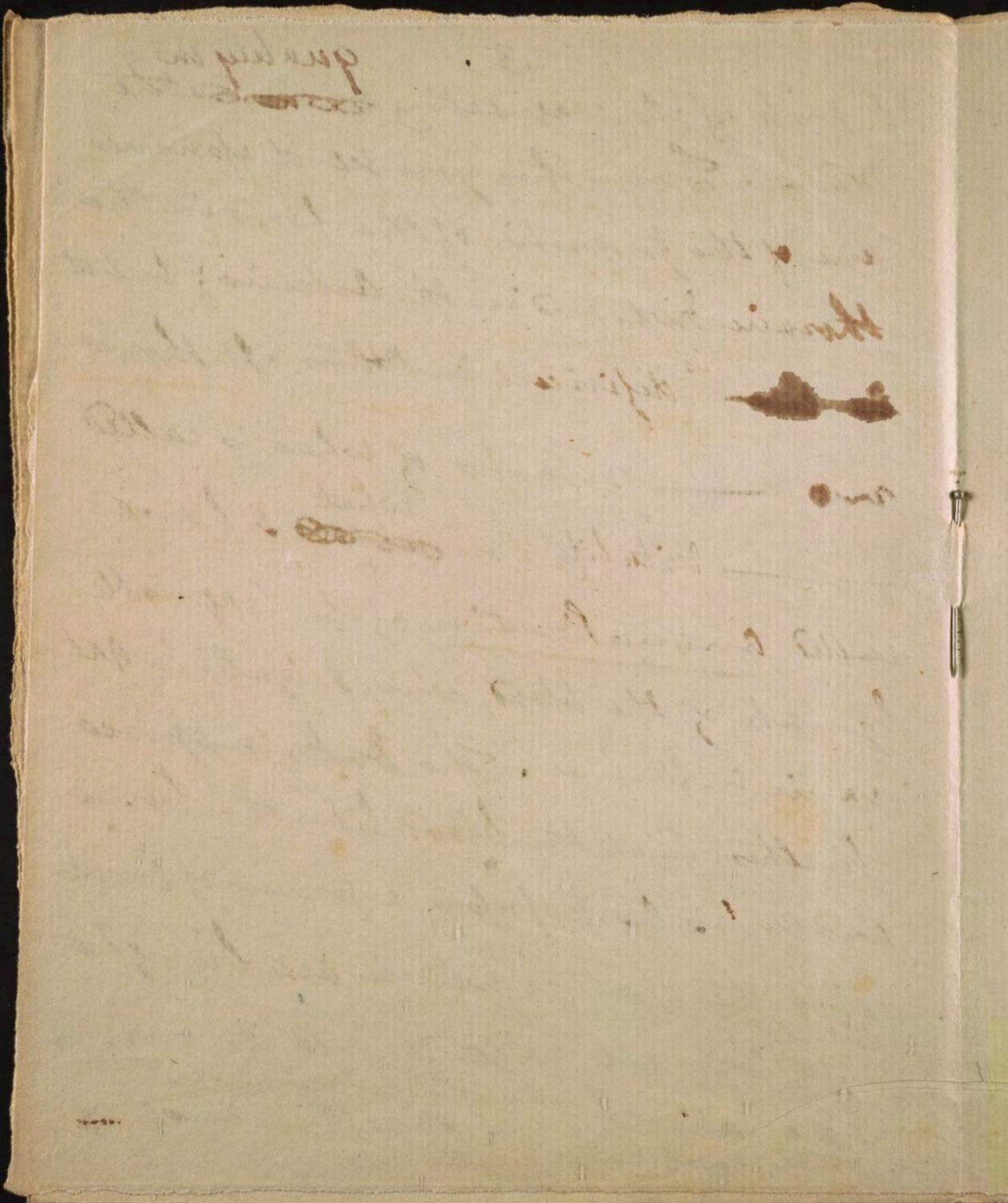
He returns to pursue the Chyle which when formed by the stomach and liver has been described as conveyed by certain vessels distributed plentifully through the small, and issuing thence the large gutts called Lacteals from the milky color of the chyle ~~it~~ which passed through them. These lacteals have been supposed to perform the office of Absorbents by some Physiologists, while others suppose they perform the office of secretory vessels, and that ^{they induce} ~~they extract~~ by their action a change upon the Chyle analogous to that which a gland imparts to the



fluids which enter into them. The Chyle
whether admitted into the Lacteals by ab-
sorption or secretion is conveyed by them
~~thru' the~~ ^{the} ~~intestines~~ into a large Canal called
the Thoracic Duct which runs along the
vertebrae, and is poured from it into the left
Subclavian Vein in which it is mixed
with the blood, and conveyed to the heart.
By what process it acquires all the properties
of blood ~~is~~ remains yet to be
explained. Dr. Hutchinson has thrown some
light upon this mysterious subject in his
ingenious inaugural Dissertation. He has
discovered by many experiments that the
Chyle is coagulable in the thoracic duct,
and after it enters the Arteries, but that



it puts off its coagulating ~~power~~^{quality in} to the
veins. From this you see it acquires
one of the properties of the blood in the
thoracic duct, and in the arteries; but it
~~is~~ deficient in others. It throwed
up — marks of what is called
vitality, or ~~what~~^{what} I have
called animatization of the coagulable
lymph of the blood, when subjected to gal-
vanic influence. The Doctor supposes
further, that the blood like the bones
and muscles possesses a power of conser-
ving the matters which are brought
into contact with it into its own na-
ture, and hence he says the cause of



Pneumification.

The fæces when precipitated from the Chyle pass slowly into the large gut. These are expansions, in order to prevent the ~~explosion of~~
~~double~~ inconveniences of our frequently discharging them. In old age they stagnate for many days without much injury to the system: on the contrary, they probably perform the offices of those Stimuli which have ^{to} used out, or have become futile in old people, and thus help to keep up the actions and machinery of life. The stagnation of the fæces in ~~the~~

The intestines of carnivorous animals are much shorter in proportion to the length of their bodies than in granivorous ~~or~~ ~~and~~ ~~herbivorous~~ ~~animals.~~

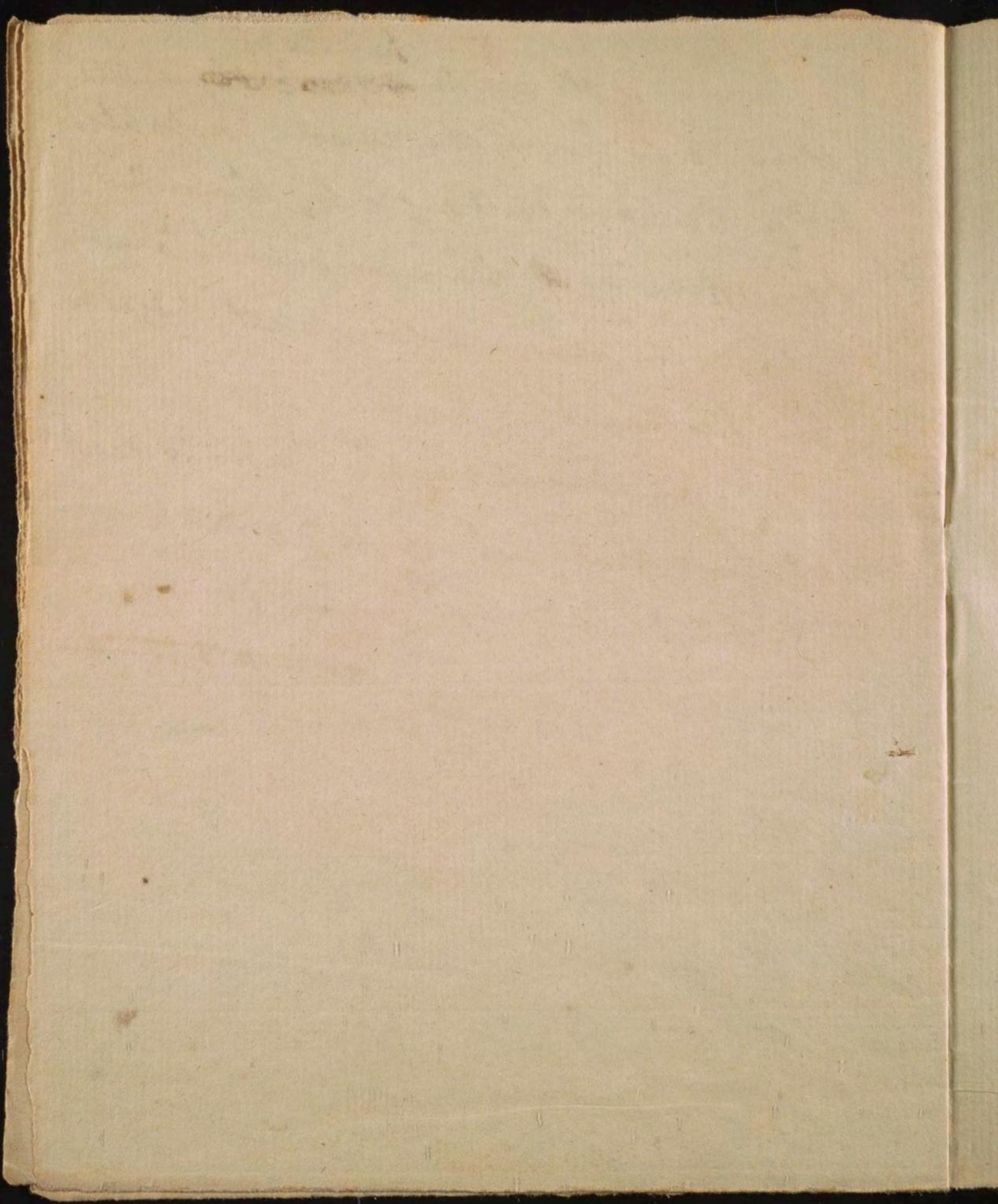
~~but~~ ~~they~~ ~~do~~ ~~not~~ ~~eat~~ ~~as~~ ~~fast~~
~~as~~ ~~the~~ ~~former~~ ~~as~~ ~~the~~
and
~~they~~ for obvious reasons. Vegetables afford their nourishment more slowly & with more difficulty than animal matters, hence they require more mastication - longer digestion from one or more stomachs & a longer course of lactals to absorb the chyle formed by vegetable food.

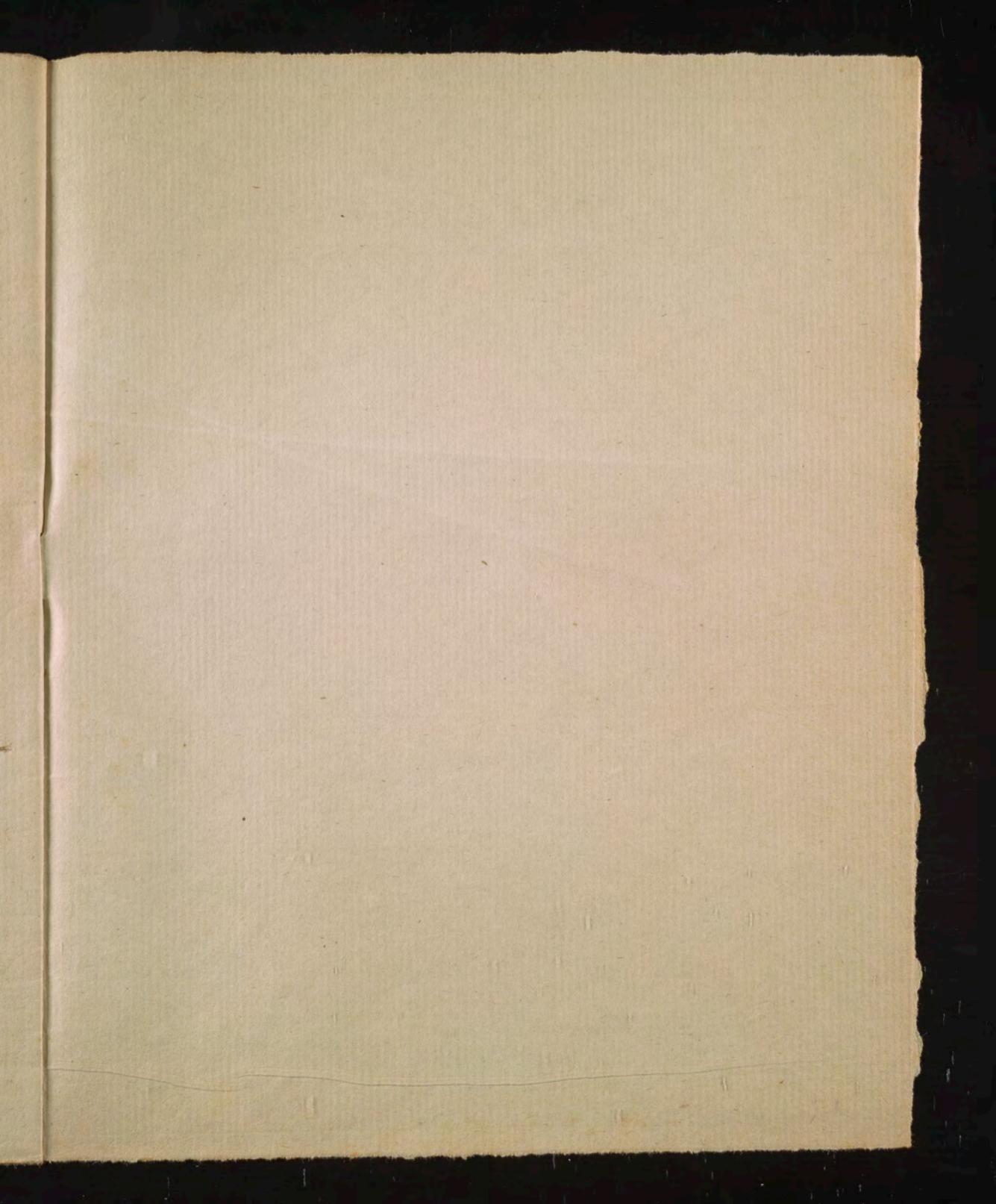
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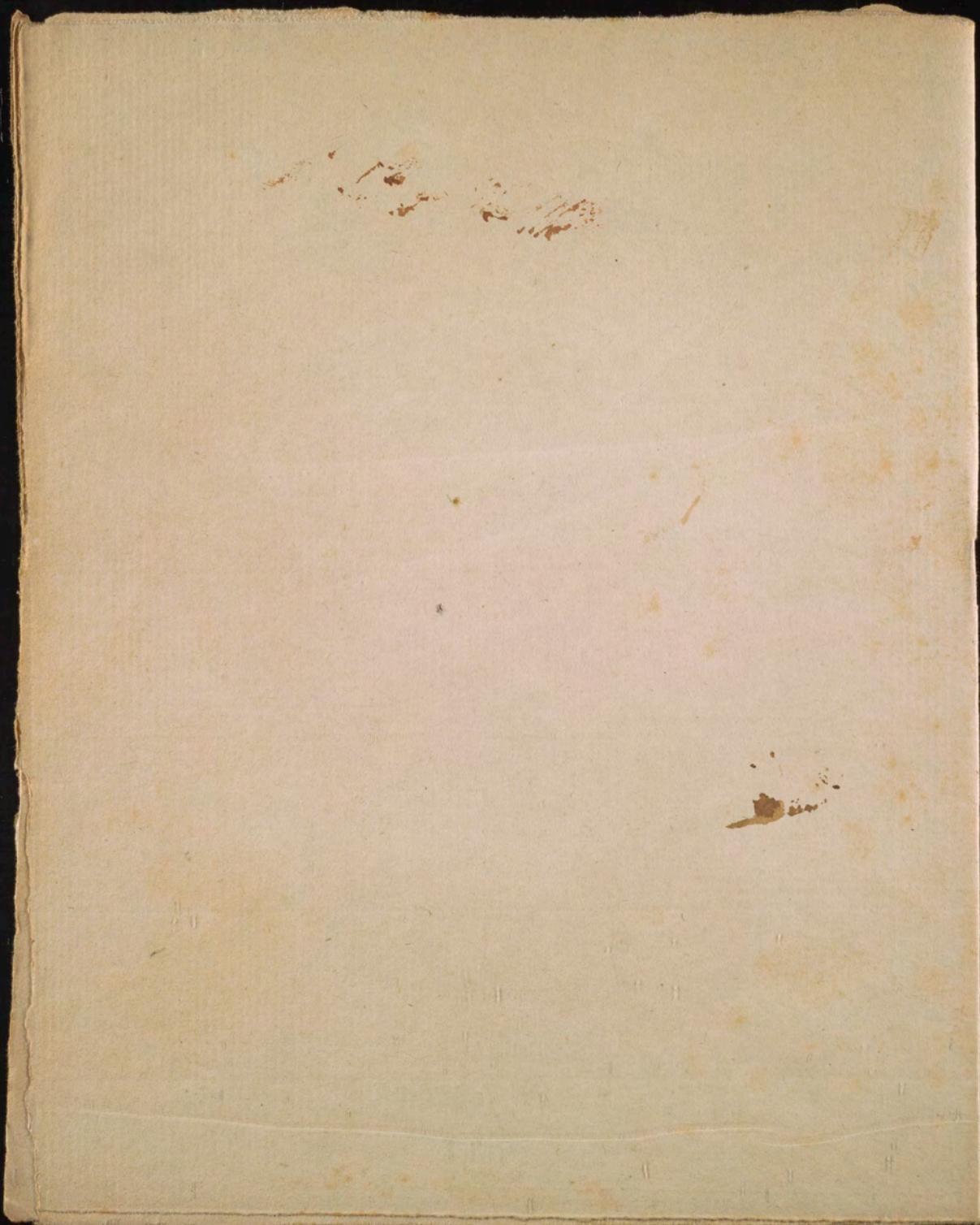
the bowels of old people ~~are~~ ^{sum to be} in the Colon, and hence the reason probably
why the wind discharged by them is
less offensive than in persons in
whom the fæces are constantly lodged in
the Rectum. ✓

we must next in order to speak
of that fluid which is formed from
the Chyle, and that is Blood.

~~so far p. 533~~







~~it does offend, as it is in childhood & middle life.~~

~~we should move rest in order to you will perceive that I have taken no notice of the office of the Liver. It~~

~~blood~~
~~treat of the Lymphatics, but before we take~~

~~leave of the materia of the functions of the~~

~~Liver, there remains one, upon the~~

~~use of which Physiologists have been divided~~

~~or silent since the freedom birth of our species.~~

~~I shall speak the Spleen. I shall attempt to explain its use by delivering over a few remarks upon it. since~~

~~V some of the Lymphatics do get in~~

~~it has been supposed poor~~

~~this contents into the Thoracic Duct, but~~

~~Dr Brown too believes that this is the case~~

~~extending the blood vessels in other places. This~~

~~from the following experiment.~~

~~This has been proved by Dr Brown by a simple~~

~~exp. - he cut up the thoracic duct in several~~

~~small animals, and put them up upon madder~~

~~ch. he found tinged their bones. It has been~~

~~several other facts favor this opinion related by~~

~~Professor established by a distinguished~~

~~Mr Richardson applied a small quantity~~

~~of G Dinctment to the ~~to the~~ tongue of a young man.~~

~~soon afterwards he observed the salivary~~

~~Glands ~~and~~. One half the ~~the~~ tongue on~~

Upwards by them in others & they ~~have~~
valves - they differ ^{slightly} in conveying ~~fluids~~
of a different quality to the thoracic duct.

(~~Having mentioned~~) ~~use of~~ ~~the~~
~~lymphatics formerly,~~
~~it remains only to speak of the lymphatics~~
~~which are the largest &~~
~~most important vessels in the body.~~
~~They are a system of~~
~~small vessels originating from all the~~
~~tissues and from the cavities of the~~
~~body, which are frequently dilating~~
~~& contracting~~
~~thru a series of glands called conglabate,~~
~~or then~~
~~discharge their contents into the~~
~~thoracic duct, which empty them into~~
~~the ~~opposite~~ veins of blood in the manner~~
~~formerly mentioned.~~

The following circumstances demand attention with respect to these vessels.

1 They appear to possess coats analogous

~~left side to be affected by it. The right side of
the mouth & tongue were wholly unaffected
by the & these facts are important, as they
show that certain medicines may be introduced +~~

~~moreover~~

✓ The fibres of these coats, possess great
irritability, - inasmuch that according
to Dr Haller ~~as~~ they disappear altogether
when they are stimulated, ~~as~~ even tho'
they be filled with their natural, or thw.
any artificial liquor. -

~~+ into the system without mixing w:
the blood, or entering the general circulation.~~
~~It is thro' the lymphatics only that
liquids pass to the kidneys from the stomach,
and hence the rapidity of their passage. A
direct communication is not necessary
for that purpose. -~~

~~+ In the course of this year 1808 I attended
a young goat, ⁱⁿ who had alighted himself
from the C disease. The ~~Second~~ Spitting &c~~

to the coats of the blood vessels, one of which
is evidently ~~and said to be~~ muscular. This appears
from their alternate dilatation & contraction,
and 2^o from their being liable to pain -

& swelling & inflammation. These coats are
much stronger in proportion to their size than the
coats of the blood vessels. V
They are all endowed with valves placed
in some cases at a small, in others at
a large distance from each other, which
prevent the reflux of the lymph, in the
same manner ^{that} the valves in the veins
prevent the reflux of the blood.

~~They~~ They are all endowed, not only with
veins, but with arteries & veins in which
the circulation is carried on with the
same regularity in the largest vessels of
the body.

~~If I have~~ It has ^{the number of}
~~the anatomy of the vessels~~ ^{with respect to}
~~animals~~
been supposed that they ^{are} all endowed with

~~Operations were on one side of his mouth only - and
the sores were healed on one side that side only of
his penis by the application of & to them. #
+ matters until they have first been dissolved
by a liquor first secreted by the arteries.~~

~~# In Dec² 1911 I attended a gentleman from
New Jersey, Judge Berger in a ^{weak} ^{recovered}, who had been
salivated by his physician ^{and especially} ^{the} affected the
right side of his mouth only. I shall con-
-descend presently to give a different opinion
of these facts in my pathology. — A~~

V6 They are said to possess a retrograde power
— by which means their contents are
propelled in a contrary direction to that
which is natural. ~~according to Dr. Dabinett~~
Dr. ~~has~~ furnished many facts in favor
of this motion in these vessels. & his father
has explained many of the phenomena
of diseases from it. see this work.

~~T Hompson which and has lately
mentioned a fact which shows that the
lymphatics convey matter to remote
parts of the body without without~~

an opening which has been called a mouth with which they not only absorb liquids, but feed as it were upon solid matters such as ~~the~~ blood - flesh, & even bone. What makes it ^{still more} probable is that they have ^{something like} mouths.

been demonstrated in several fish ^{(Dr}
~~monro supposes the Lymphatics do not affect them)~~

5 The Lymphatic glands appear from filling them with ~~it~~ to be cellular, but Dr monro has demonstrated that they are composed of convoluted vessels. Mr Henderson however thinks he discovered a cellular structure in some of the smallest glands. It is certain that the blood vessels - nerves & the small cells of the smallest gland are connected together by cellular membrane.

Having delivered these general Observations, we proceed next to inquire in what manner the lymph which is carried

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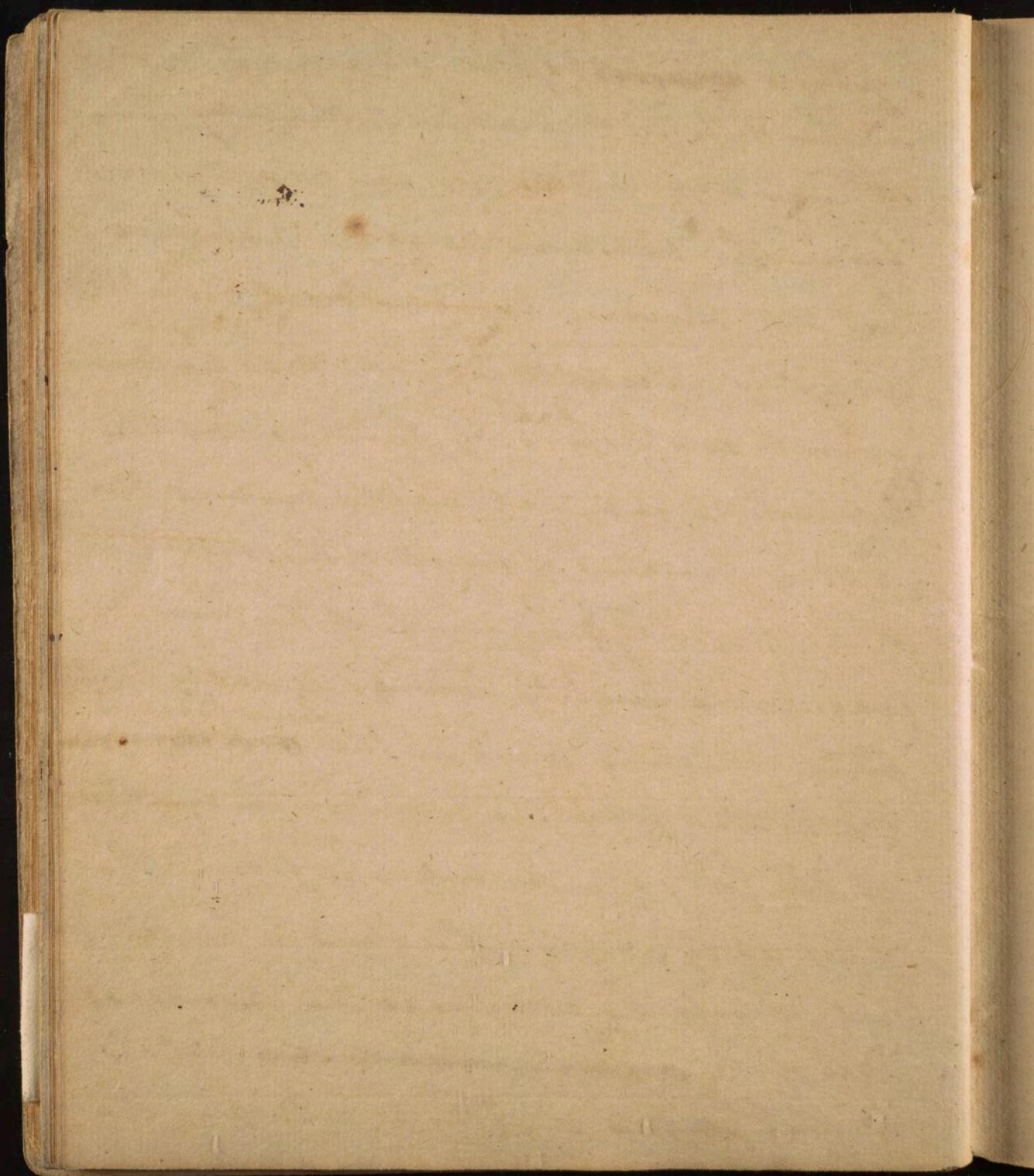
A Upon Dr. Monro's exp^r of the facts I have related I shall
In the mean while I shall only remark
that ~~the~~ ^{coloring matter of the} Urine I believe that the Urine passed
^{penetrated} ~~the~~ into the solids of the body, and excreted of the
Stomach as it does ~~of the~~ in Dr. Monro's
exp^r and thus found its way into the general
circulation by which it was conveyed to the
bones. The same thing probably took place in
the exp^r of Mr. Horne upon a rabbit in
which he tied up the ^{just before it entered} ~~the~~ ^{the} ureter at the
junction between the left left Inguinal
& sublavian Veins, and afterwards gave
injected $\frac{1}{2}$ of strong Infusion of Rhubarb,
in $3/4$ of an hour, the Urine was voided,
& the presence of Rhubarb detected in it
by the addition of potash to it. It passed
into the gall bladder in Mr. Horne's 2nd
~~the~~ experiment in a dog in ^{out} the ^{wh} same way.
That the effects nothing can be

inferred in favor of Dr. Monroe's opinion
from & affecting but one the lymphatic
glands of one side only. I hope in our pa-
thology to give a more satisfactory explanation
of these facts. I will only remark further,
~~you notice that~~ ~~I send to you a copy in~~ ~~fore-~~
that I do not think that we require a passage
from the stomach to the kidneys to account
from the sudden ^{widens} rapid excretion of urine after the
stomach has been overcharged with
watery liquor. It may be explained
upon another principle to be mentioned
hereafter.

the intervention of the thoracic duct. By applying galvinitment to the leg, ~~of a~~
~~young man, he affected the salivary glands~~
~~of the left side only, and one half the~~
~~tongue.~~ ~~With those aphthous sores~~
which attend a salivation - the right
side was wholly unaffected with the G.

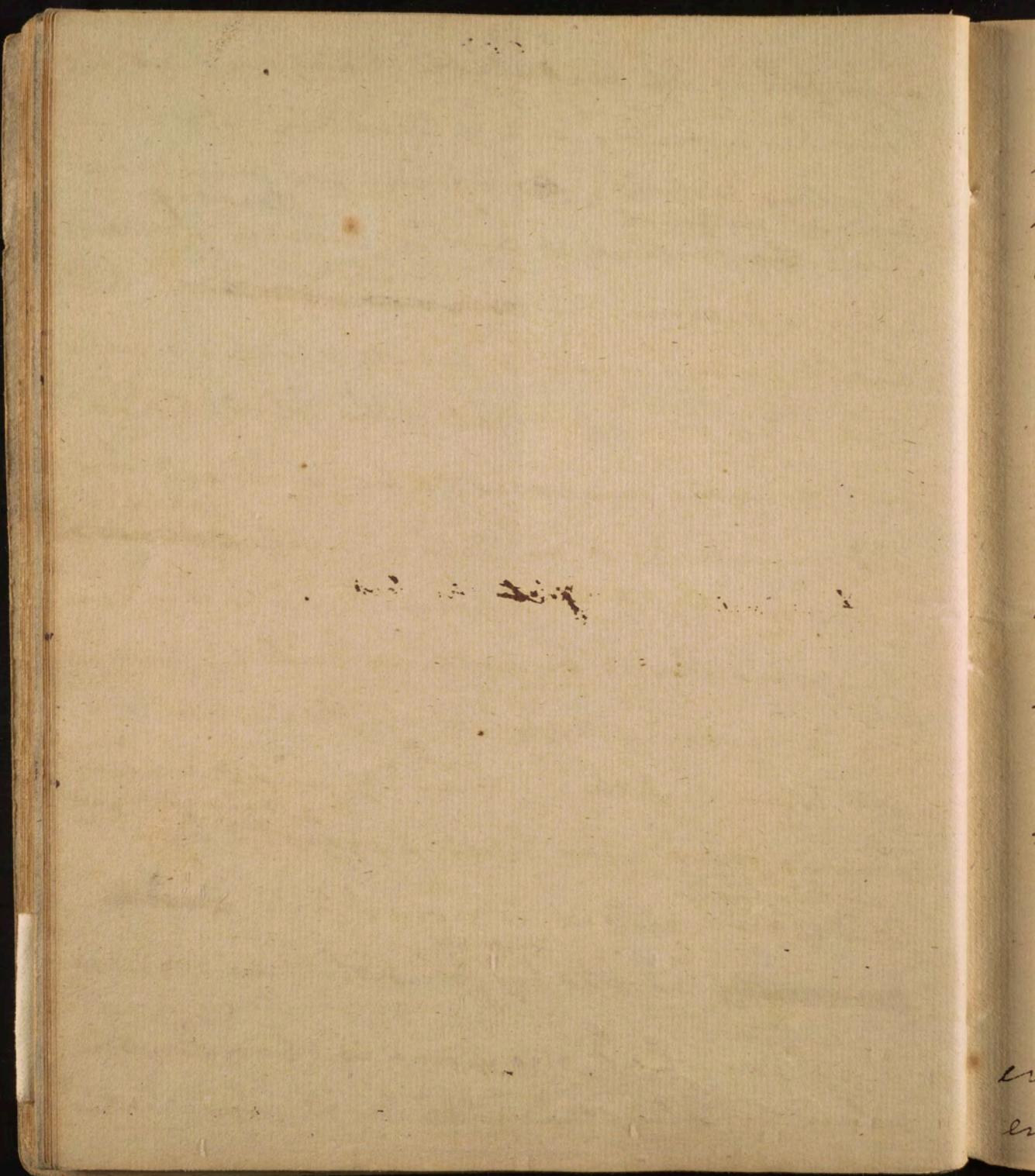
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by these ~~exterior~~ vessels to the heart is found
in the different cavities of the body. Formerly
it was supposed to be an exudation
from the extremities of the arteries,
but Mr. Brown has made it probable
that it is a secreted liquor. This he inden-
-cions to establish by proving that the
lymph is of a coagulable nature, &
that it partakes of most of the properties
of the ^{ting} coagulable lymph of the blood. This
coagulable quality belongs equally to the ^{lymphatic} vessels
fluid which is found in the ~~exterior~~ with
with that which is found in the cavities
of the body. 2 He infers it from the
diseases to which this fluid is liable,
all which he ascribes to the disordered
state of the ~~exterior~~ vessels
which secrete it. E.g.: In a Drossey the



Lymph is less evapourable than in health. This he ascribes to a relaxation in the secretory vessels. Again. we sometimes find ~~the~~ surfaces of the pleura - trachea - diaphragm & even the ~~inside~~ ^{inside} ~~parts~~ of the heart covered with a crust which resembles the sicc or buffy coat of the blood. This Mr. Henson supposes to be produced by too much tone or action in the ~~vessels~~ which secrete the lymph - & lastly - he supposes this to be nothing but the product of a certain degree of inflammation in these vessels. - This opinion concerning yours was first suggested by Dr Morgan, and it is now I find ~~most~~ many adopted by Physiological writers.

In what manner is the lymph when secreted taken up by the sympathetic?



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It has commonly been supposed by means of capillary attraction - hence their name of Absorbents - but I would rather suppose that it is by the effect of muscular contraction excited by the ^{or matter taken up,} Specific stimulus of the Lymph, upon the Mouths of the Lymphatics. -

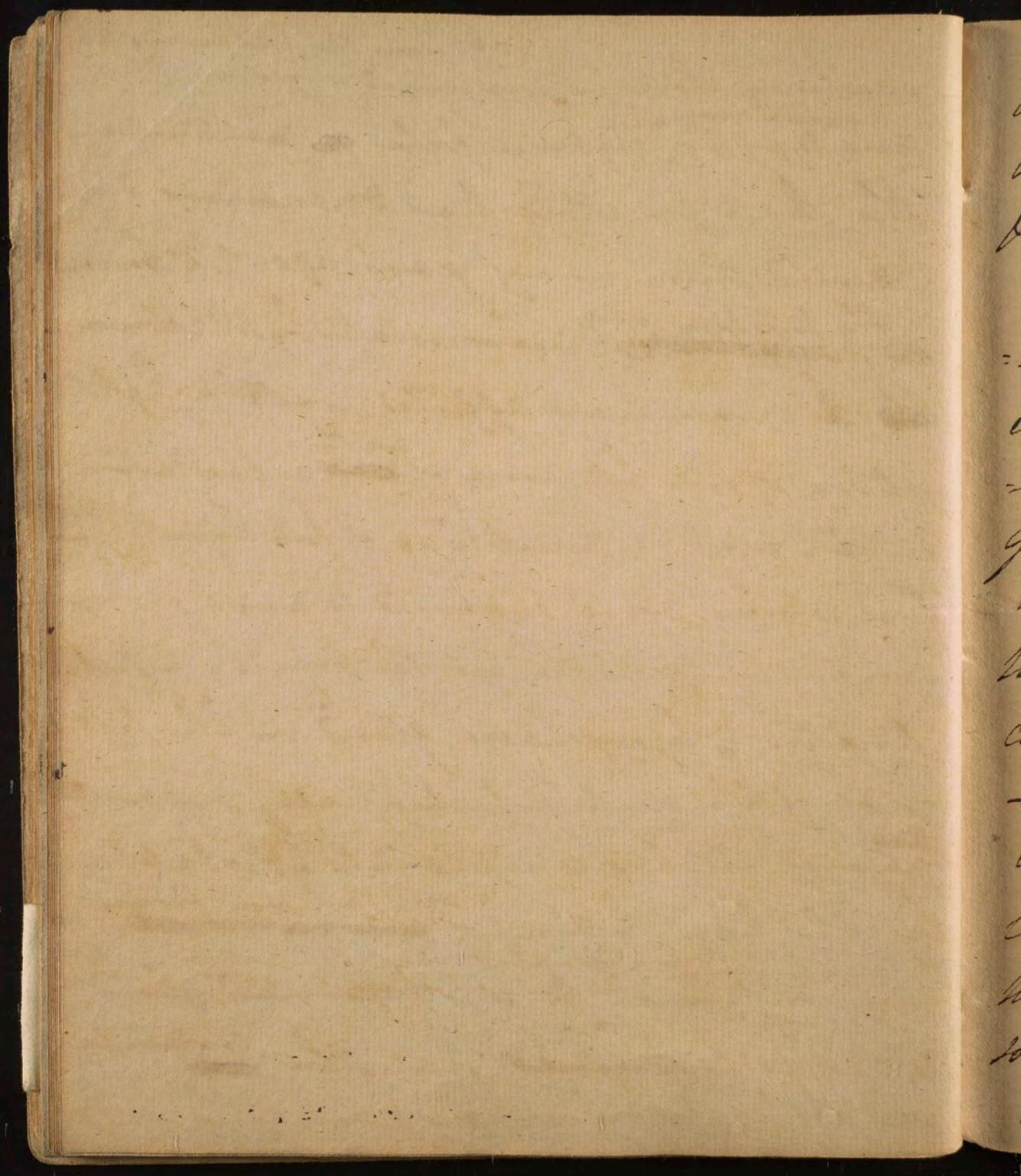
In what manner is the Lymph when it enters the Lymphatics conveyed to the ~~and throughout~~ ^{the body} ~~throughout~~ ^{the} ~~body~~? ^{the} answer is by the pulsation of adjoining Arteries - 2 by the pressure of contiguous muscles - and 3 by the stimulus of the Lymph acting specifically & mechanically upon the lymphatic vessels in every part of their course.

Are lymphatic vessels found in every part of the body? I answer in every part except the head, and there

V 3rd from the cures which have been
made of the Hydrocephalus internum,
which dispositions prove to arise from
an effusion of water in the ventricles
of the brain. — ff.

666 from the following ex-
istence there is presumed,¹ from the
circumstances.
analogy in certain fishes & particularly
the State in whose head Dr Monroe dis-
covered them many years ago 2^o. From
~~the history of a~~
~~dead patient~~ disease related by Mr Hanson.

A man was affected with a slight
palsy of his left arm ~~with~~ a hesitation
in ~~his~~ voice & a trembling of his lips. These
symptoms were supposed to arise from
some compression in the brain. A swelling
in a lymphatic gland in the left
side of the neck which finally suppured,
~~removed~~ all his complaints - Probably
by the translation ^{an effusion from}
^{or cephalic} ~~into~~ an internal to an external gland,
It is presumed from the ~~certainty~~
that the veins in no part of the body



absorb Lymph. This has been proved by many experiments made by Monroe & Hunter.

I have said that the Lymphatics absorb Solid as well as fluid bodies. This is evident from many facts. The ~~dead~~ destruction or annihilation of the Thymus gland can be accounted for in no other way. The greater levity of the bones of old than of young even, - the absorption of the color imparted to the bones by madder, - the peritonaeal softness of the bones in certain diseases, - & the detection of bone matter in the Urine, all prove that the Lymphatics possess a power over solid matters. - To these we may add the occasional disappearance of Schistous

¶ It would seem from this fact, that
the Arteries & lymphatics perform
opposite offices in the system. The
business of the one, is to repair - of the
Other, to destroy different parts of the body -
- of the one to secrete ~~off~~^{& excrete} a fluid,
& of the other, to absorb it & mix it again
with the blood from which it was secreted.
Health consists in this strife between the
Sanguiferous & lymphatic systems, and
no longer does an armistice take
place between them - than we
behold ~~as~~ Dropsy - Diabetes - Rickets - and
Sclerosis - & ^{etc} more hereafter.

tumors & wens in every part of the body. They ^{appear to be} removed only in consequence of the action of the lymphatics upon them.

Mr Hunter has remarked that in infancy the cavity of the thigh bone is remarkably small. As the child advances in age, this cavity becomes larger - Thus while the arteries add bony matter to the external, the lymphatics ~~do~~ consume & absorb the internal part of the ~~bone~~ bone. In this manner - it is probable the ~~bones~~ solids are constantly undergoing a renovation in a greater or less degree, more especially in the early part of life. ✓

~~But we have not yet done with the offices of the lymphatics. They~~

I have said ~~the Lymphatics absorb~~
~~Absorption takes place~~
from ~~internal~~ parts of the body, but
it has long been believed that they
absorb likewise from the surface of the
body, and ~~under a diagnosis~~ ~~suspicion of~~
many practical inductions in
pathology and the practice of physic
have been made from it. =

